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August 20, 1990 • #73

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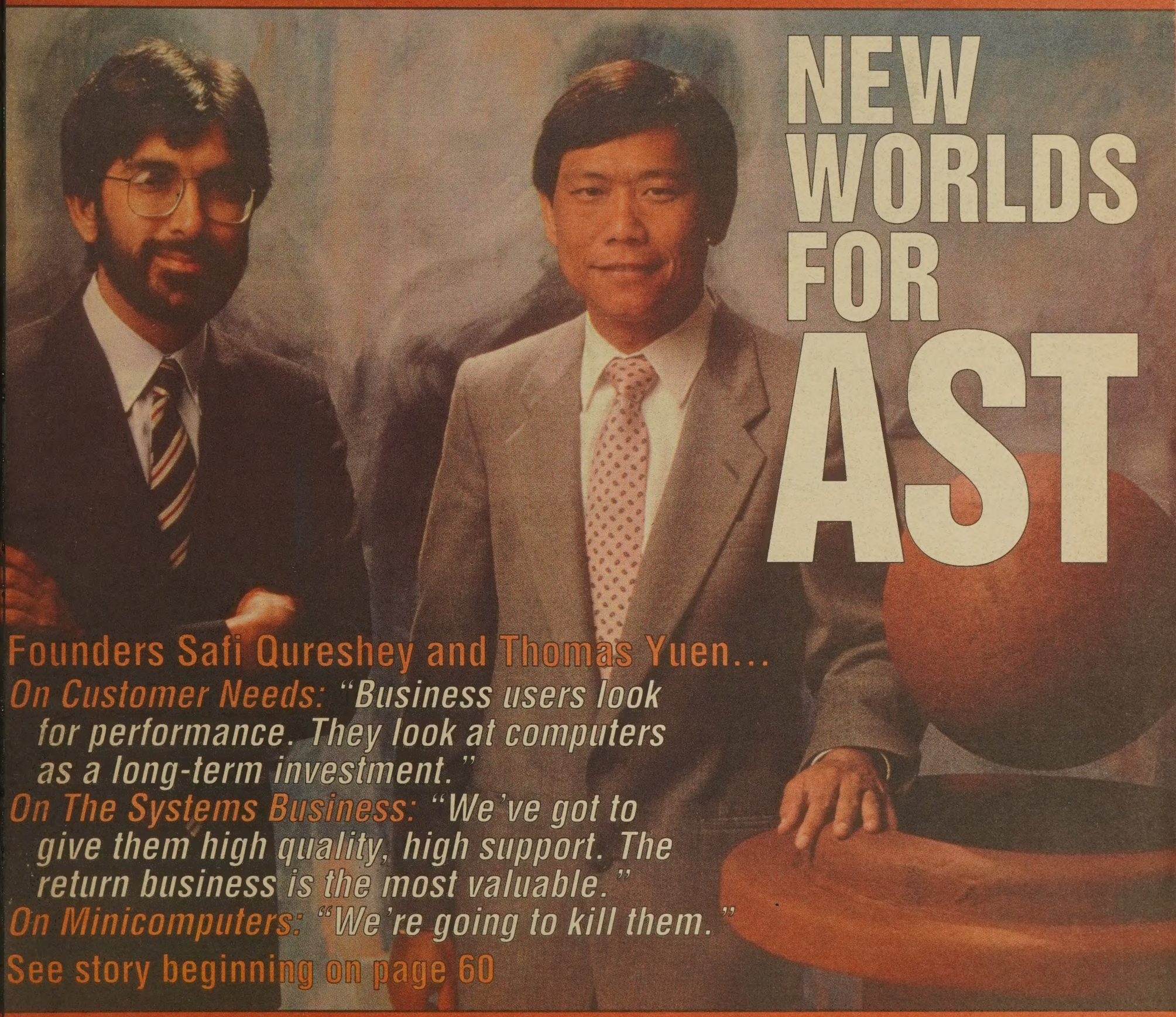

NEW WORLDS FOR AST

Founders Safi Qureshey and Thomas Yuen...

On Customer Needs: "Business users look for performance. They look at computers as a long-term investment."

On The Systems Business: "We've got to give them high quality, high support. The return business is the most valuable."

On Minicomputers: "We're going to kill them."

See story beginning on page 60

JIM WARREN ON LOOK AND FEEL:

"Which automobile manufacturer first used the 'H' pattern for the transmission shift mechanism? Which furniture maker first offered a chair with four legs? Boy, are THEY gonna clean up."

See page 30

COMPUTERIZING THE ACCOUNTING DEPARTMENT:

"If anyone tells you that Brand X accounting software will do the job for you without having analyzed the needs of your business, run in the opposite direction. No accounting package does everything for everyone."

See page 37

DVORAK ON LOOK AND FEEL:

"The hope of improving an idea and progressing towards some brighter future will be dimmed forever if Lotus wins the case against Borland."

See page 122

Quality and Performance
. . . and Big Savings!

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PACER 12
TURBO SYSTEM

- IBM XT Compatible
- 12 MHz CPU
- Phoenix Bios
- 640K RAM on Board
- 360K Floppy Disk Drive
- 150W Power Supply
- Parallel Printer Port
- Game Port
- Serial Port
- 101 Enhanced Keyboard
- Clock & Calendar
- Desktop Case w/Reset Button, LED Light & Keylock
- Seagate ST 225 20 Meg Hard Drive
- 12″ Amber Monochrome Monitor
- Hercules Compatible Graphics

$969

w/40 MB Hard Drive

PACER 286-12
VERTICAL SYSTEM

- Full Size Case w/200w P/S or Vertical Case
- 6/12 MHz Turbo AT Motherboard
- 1 MB Zero Wait State RAM On Board
- Expandable to 4 MB
- 8 Expansion Slots Available (5 available)
- 0 Wait State
- 80287 Coprocessor Socket
- 101 Key Enhanced Click Keyboard
- Serial, Parallel and Game Ports
- 12″ Amber Monochrome Monitor
- Hercules Compatible Graphics
- 1.2 MB Floppy Drive 5¼″
- 40 MB 28ms Hard Drive
- Hard & Floppy Drive Controller
- Clock, Calendar w/Battery Backup

$1059

w/40 MB Hard Drive

PACER 386-SX
SYSTEM

- Full Size Desktop Case w/200w P/S or Vertical Case
- 8/16 MHz 80386SX Motherboard
- 1 MB Zero Wait State On Board
- Expandable to 8 MB
- 8 Expansion Slots (5 available)
- 0 Wait State
- 80387SX Coprocessor Socket
- 101 Key Enhanced Click Keyboard
- Serial, Parallel, and Game Ports
- 12″ Amber Monochrome Monitor
- Hercules Compatible Graphics
- 1.2 MB Floppy Drive 5¼″
- 40 MB 28ms Hard Drive
- Hard & Floppy Drive Controller
- Clock, Calendar w/Battery Backup

FREE Modem w/any system purchase

HARD DISKS

Seagate ST 225	$205
Seagate ST 238	229
Seagate ST 251-1	319
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Micropolis 1335 71 MB 28ms	595

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150W XT Power Supply	$38
150W XT UL Power Supply	45
200W Baby AT Power Supply (XT size)	48
200W Baby AT UL Power Supply (XT size)	55
200W AT Power Supply	49
200W AT UL Power Supply	59

PRINTERS

Panasonic KX-P1180 (182 CPS)	$185
Panasonic KX-P1191 (240 CPS)	239
Panasonic KX-1124 (24 pin-200 CPS)	329
Panasonic 1624 Printer	549
Panasonic Laser Printer	1395
Epson Laser Printer	1095

KEYBOARDS

101 Key Enhanced Keyboard Click	$34
Amptron 101 Keyboard	45
BTC 102 Keyboard	39

I/O CARDS

Multi I/O Card (rechargeable)	$36
AT I/O Card w/2 Serial/1 Parallel/ 1 Game	29

DISPLAY CARDS

Monochrome Graphic w/Printer Port (4464)	$28
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640x480 Auto EGA Card	79
VGA Card 16 Bit 1024x768 w/512K	125
VGA Card 800x600 w/256K	99

CONTROLLER CARDS

Floppy Disk Controller	$16
1.2M/360K/1.44M/720K Floppy Controller	32
Western Digital Gen Card w/Cable	44
WD 2:1 MFM H/F Controller w/Cable	78
WD 1:1 MFM H/F Controller w/Cable	89

CASES

AT Jr. Slide Case/XT	$29
5 Slots AT Case (2 Internal)	49
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Mitsumi 3.5″ 1.44 MB Floppy Drive	76

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Logitech Mouse	48

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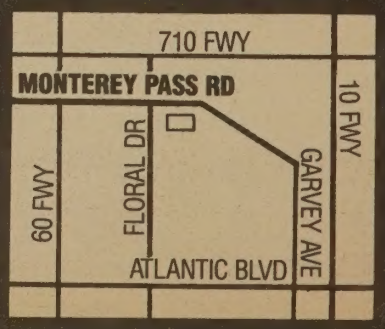

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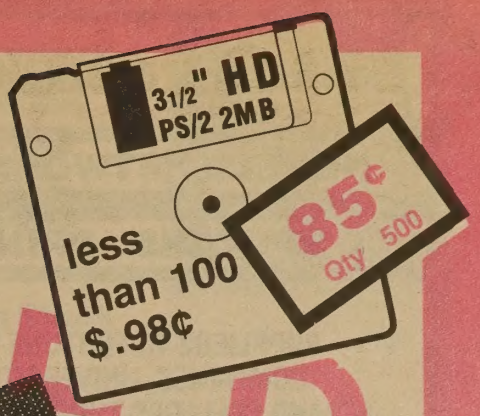

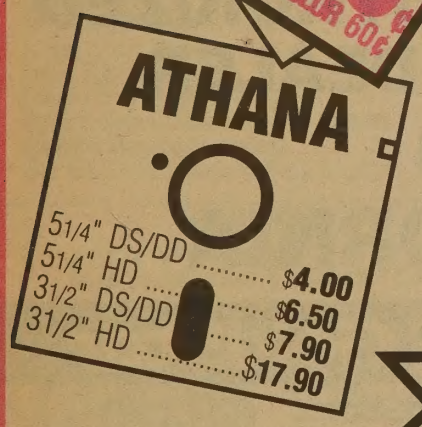

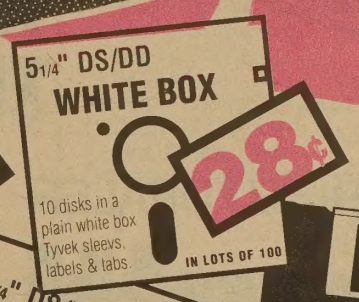

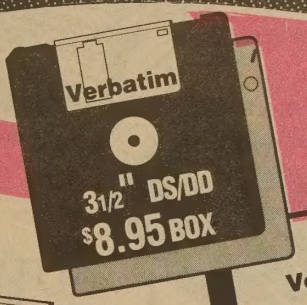

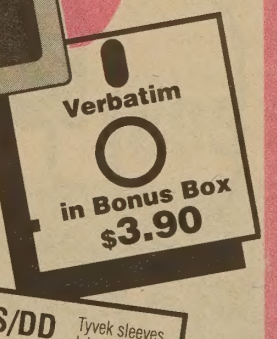

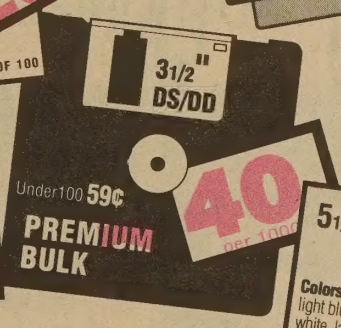

5¼" DS/DD
Tyvek sleeves, labels & tabs.
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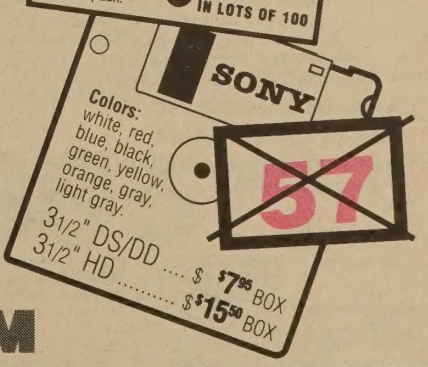

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5¼" HD Preformatted	~~8.95~~ BOX
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3½" HD	~~14.95~~ BOX

KAO

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5¼" HD	~~7.50~~ BOX
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5¼" Diskholder holds over 100 diskettes	$8.95
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3½" Diskholder holds over 50 diskettes	$9.50
3½" Diskholder holds over 80 diskettes	$10.95
3½" Deluxe Library Case holds over 20 diskettes Perfect Data	$14.95
3½" Smokey Deluxe Library Case holds 10 diskettes	$1.50
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Keyboard Drawer ..... Wooden-$39.95, Grey Metal-	$29.95
Keyboard Drawer ..... Under Table	$24.95

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DC-600A	$19.95
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Maxell CS 600 HD	$19.95
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EXTRAS

Paper Sleeves	2¢
Tyvek Sleeves	4¢
Labels & Tabs	2¢

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Shipping: 1st 100 diskettes, **$3.00**, each additional 100, **$1.00** — UPS, COD, Add **$3.30**

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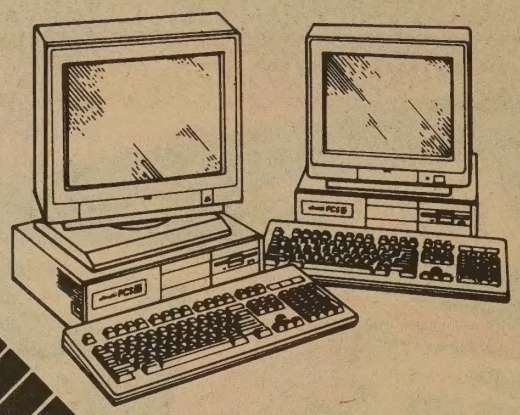

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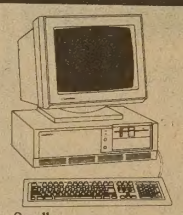
GoldStar

GS100 8088-10

Entry-Level System
IBM PC/XT Compatible



Features

- Second-generation system features:
  Low power consumption (87W), high reliability; Small footprint motherboard; Dual floppy disk controllers; Speed selectable by keyboard or DIP switches
- Front panel power and reset switches
- MS-DOS 3.3 and GW-BASIC
- 101-key enhanced keyboard
- 24-Hr testing of motherboard and system at elevated temperature

SUGG. RETAIL $995

Specifications

Motherboard	8088 - 1 CPU; 10 or 4.77MHz; Socket for 8087; Dual floppy controller; One serial and one parallel port; Real time clock with battery back-up
RAM	640KBytes standard
Disk Storage	Space for 2 H/H 5.25" devices; FDD: Standard one 5.25" 360KByte drive; HDD: Optional
Video	MONOCHROME CARD
Expansion Slots	Four slots
Power Supply	87 Watts, 115V
Keyboard	101 key keyboard
System Software	MS-DOS 3.3/GW-BASIC; Phoenix ROM BIOS
Dimensions	14.5" x 15.4" x 5.3" (WxDxH)
MONITOR	12" HI-RES AMBER MONITOR

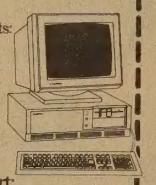
$495

GoldStar GS230

80286-16

Features

- Small footprint system features:
  Dual floppy disk controllers; Three 16-bit and two 8-bit slots; 130W power supply (low power consumption and high reliability); One serial and one parallel port; 1MB memory standard - expandable to 5MB
- Two 5.25" and one 3.5" half-height slots available; HDC LED and power/speed LED
- Front panel power, reset and key-lock switches
- MS-DOS 3.3 and GW-BASIC; LIM-EMS 4.0 support; Shadow RAM for BIOS and video ROM to improve system performance; OS/2 support
- Novell certification
- 24-Hr testing of motherboard and system at elevated temperature



SUGG. RETAIL $2495

Specifications

Motherboard	80286-16 CPU; 16 or 8MHz; Socket for 80287; Dual floppy controller; One serial and one parallel port; Real time clock with battery back-up
RAM	1MBytes standard; Expandable 5MByte on board
Disk Storage	Space for two H/H 5.25" and 1 H/H 3.5" devices; FDD: Standard one 5.25" 1.2MByte drive; HDD: 20 Meg Hard Drive
Video	
Expansion Slots	Five slots (three 16-bit and two 8-bit)
Power Supply	130 Watts, 115V
Keyboard	101 key keyboard
System Software	MS-DOS 3.3/GW- BASIC; Phoenix ROM BIOS
Dimensions	15.0" x 15.0" x 6.0" (WxDxH)

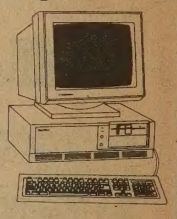
$995

GoldStar GS320

80386-20

Features

- Small footprint system features:
  Dual floppy disk controllers; One 32-bit, five 16-bit and two 8-bit slots; 1MB memory standard-expandable to 2MB; One serial and one parallel port; Speed switchable by keyboard or setup program (8/20); 200W power supply
- Three half-height storage devices available; Shadow RAM for BIOS and video ROM to improve system performance; LIM-EMS 4.0 support; OS/2 and Novell support
- HDC LED and power/speed LED; Front-panel reset and key-lock switches; MS-DOS 3.3 and GW-BASIC
- Novell certification
- 24-Hr testing of motherboard and system at elevated temperature



SUGG. RETAIL $3995

Specifications

Motherboard	80386 - 20 CPU; 20MHz; Socket for 80387; Dual floppy controller; One serial and one parallel port; Real time clock with battery back-up
RAM	1MBytes Standard; Expandable to 2MByte on board; Expandable to 10MByte high speed memory with RAM board
Disk Storage	Space for 3 H/H 5.25" devices; FDD: Standard one 5.25" 1.2MByte drive; HDD: 65 MB Hard Drive
Video	14" VGA Color Monitor & Card
Expansion Slots	Eight slots (one 32-bit, five 16-bit and two 8-bit)
Power Supply	200 Watts, 115V
Keyboard	101 key keyboard
System Software	MS-DOS 3.3/GW-BASIC; Phoenix ROM BIOS
Dimensions	18.5" x 16.0" x 6.1" (WxDxH)

$1995

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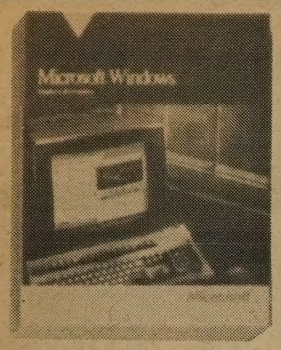

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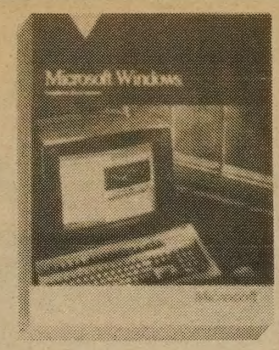

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80386SX-16*

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PRIVILEGE 386SX -16

Intel 80386SX Chip
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Expandable to 8MB on Motherboard
1.2 Meg Floppy Drive
Medium Tower Case
65 Meg Hard Drive
16 Bit VGA Card
14" VGA Color Monitor & Card
Serial, Parallel, Clock
Enhanced 101 Keyboard
One Year Limited Warranty Parts & Labor
Supports Math Co-processors

$1795

80386-25*

0 WAIT STATE

Intel 80386-25 Chip
Two Meg of Ram
Expandable to 8MB on Motherboard
Hard and Floppy Controller
1.2 Meg Floppy Drive or 3½" 1.44
Medium Size Tower Case
65 Meg Hard Drive
16 Bit VGA Card
14" VGA Color Monitor w/card
Enhanced 101 Keyboard
2 Serial, Parallel, Clock
One Year Limited Warranty Parts & Labor

$2395

80386-33*

0 WAIT STATE

32K Cache
386-33
Phoenix BIOS
Intel 80386-33 MHz Chip
Two Meg of Ram
Expandable to 16 MB on Motherboard
1.2 Meg or 3½" Floppy Drive
Hard and Floppy Controller
Super Tower Case
Enhanced 101 Keyboard
Serial, Parallel, Clock
55 MHz Landmark
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Superior 9 wire print quality

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CITIZEN Color On Command

CITIZEN GSX-140

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CITIZEN Color On Command

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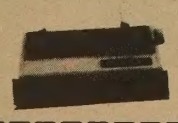
$299 w/Cable

star micronics

$169 w/cable



NX1000II

- 180 CPS draft/45 CPS NLQ
- 9 Pin Dot Matrix
- 4 NLQ fonts
- Paper Parking
- IBM/Epson compatibility
- Friction/push tractor feed

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KXP1180i

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- 4 built-in NLQ fonts
- Rear, top, bottom paper feed
- Auto load & paper parking
- 2 year limited warranty

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- 192 CPS draft/63 CPS LQ
- 5 resident LQ fonts
- 4 paper feed paths
- Push pull/tractor & friction feed
- Auto load & paper parking
- Epson & IBM Compatible
- 2 year limited warranty

Sugg. List $499

$299 w/Cable

KXP1624

- 192 CPS draft/63 CPS LQ
- 16.5" carriage, 13.6" print line
- 5 resident LQ fonts
- 4 multiple paper feed paths
- Auto load & paper parking
- Epson & IBM Compatible
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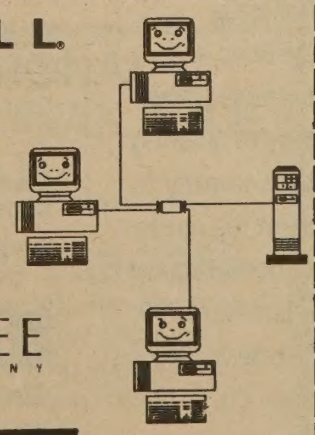

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MICROTIMES™

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A NOTE FROM THE EDITORS

When we first wrote about AST Research back in 1985, it was very much a small entrepreneurial organization on the way up. Today it's a huge multinational systems vendor, and just posted record revenues for fiscal 1990 after last year's reorg-related losses.

Contributing editor Wayne Yacco made the trip to AST's Irvine headquarters last month and spoke with cofounders Safi Qureshey and Thomas Yuen. They talked about the company's development as a provider of complete business systems and explained how they're tailoring the company to meet the needs of domestic and international business. See page 60.

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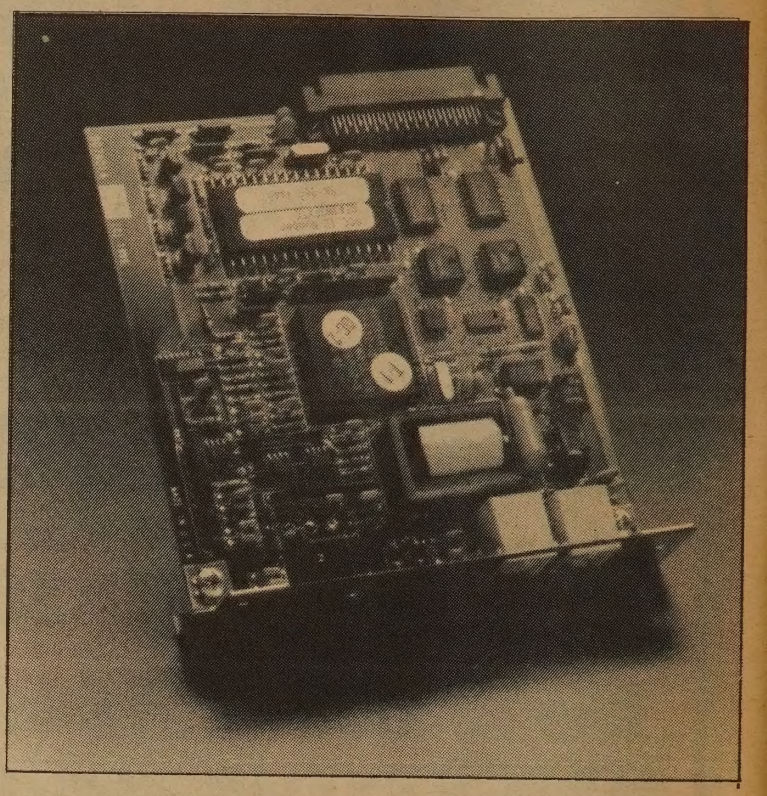

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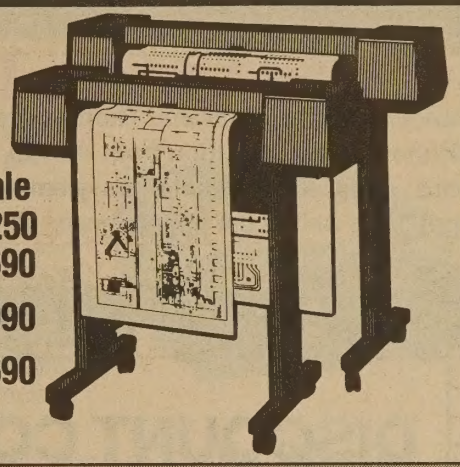

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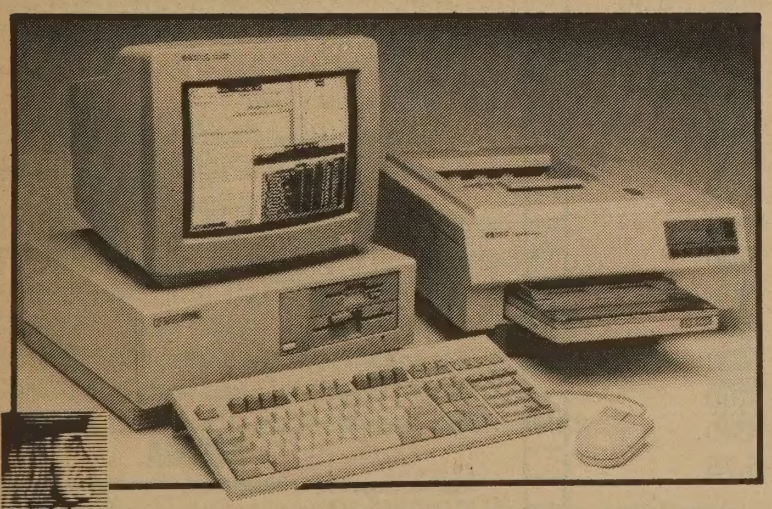

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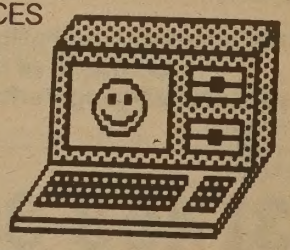

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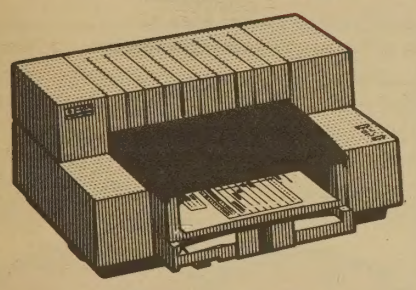

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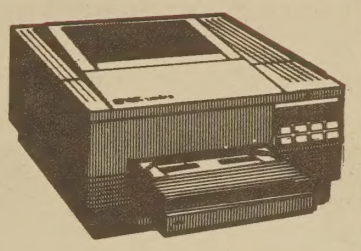

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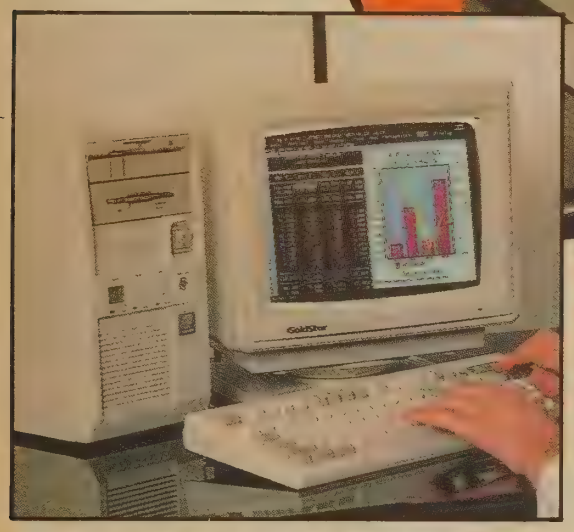

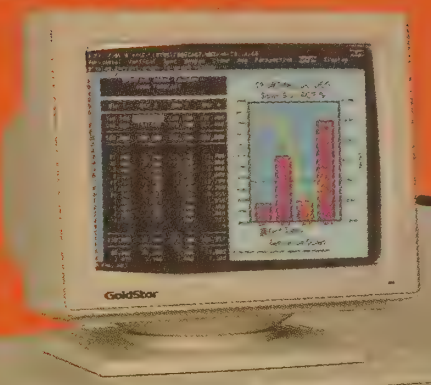

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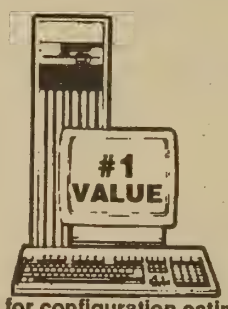

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INDUSTRY INSIGHT

BY PAUL HOFFMAN

LITIGATION THROUGH ADVERTISING

Recognizing that it takes years for court cases to be decided, litigants in two major copyright cases have taken their arguments to the consumers in major advertising campaigns.

Borland, recently sued by Lotus after Lotus won its look-and-feel case against Paperback Software, has taken out full-page ads in many computer journals showing the obvious differences between Quattro Pro and 1-2-3. Computer Support Corporation (CSC), makers of the popular Arts & Letters clip-art series, has taken out ads in many magazines pointing out that Software Publishing Corporation (SPC), the publisher of Harvard Graphics, stole its artwork and then attempted to get a court to say that clip-art is not copyrightable.

Borland's ads in such industry magazines as *InfoWorld* and *PC Week*, as well as the *Wall Street Journal* and the *New York Times*, take direct aim at Lotus's lawsuit with the tag line, "Judge for yourself." They state that "Quattro Pro is radically different from Lotus' 1-2-3" and "At Borland, we believe in software craftmanship and are fighting for your access to *real* innovation." The screen dumps show the large differences in the way that the screen looks when many worksheets are open at the same time and point out that you cannot view a graph in perspective mode in 1-2-3.

Paul Hoffman is an industry analyst who has been covering microcomputer technology for ten years. He can be reached on USENET (phoffman @well) and MCI Mail (264-3171). He also writes popular microcomputer books.

CSC's suit against SPC is somewhat more contentious. Last year, SPC asked CSC to license some of its clip-art for use in Harvard Graphics. In April of this year, SPC filed a suit in federal court asking the judge to rule that clip art is not protected by copyright laws.

CSC, about one tenth the size of SPC, countersued. At the same time, it took out ads in major computer magazines pointing out the dangers of SPC's suit (if it wins) as well as showing that SPC clearly stole the art from CSC. The ads show both inadvertent and purposeful errors that CSC made in its art, errors that appeared identically in Harvard Graphics. For example, CSC's picture of the Stealth bomber was based on an artist's rendition in 1988. That picture had sharp creases in the wings and wing flaps, neither of which appeared in the actual bomber. The picture that comes with Harvard Graphics has both of the erroneous features.

By going to the public with their claims, Borland and CSC hope to embarrass their competitors. Given that many people in the computer industry are exasperated with the amount of litigation that is taking place, they will probably be at least partially successful. Borland, although a large company, can easily make Lotus look like a bully and a company run by lawyers, not computer professionals. Similarly, CSC hopes that it can portray SPC as a group of thieves who were caught in the act and are trying to weasel their way out of a suit by claiming that clip-art is not copyrightable. Advertising is not free, of course, but it works much faster than waiting what will probably be many years for a judge to decide a case.

In the end, of course, it should be the consumer who decides what products should and should not be in the marketplace. Certainly, Quattro Pro is doing very well and is steadily eroding 1-2-3's dominance. Since the decision in *Lotus v. Paperback Software* is recent, consumers have not had time to formulate a plan to react to the case. For example, people who feel that the judge was wrong about the intent of the Copyright Act could lobby Congress to change the law. They could also decide to wait out the appeals process, which will definitely take at

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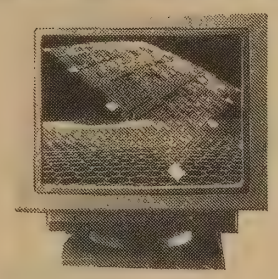

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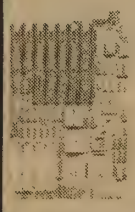

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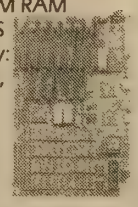

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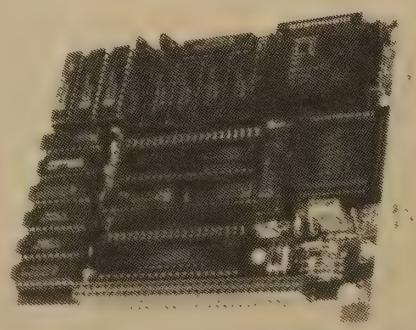

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Lotus has not taken out ads that say, "We won in court—now you should buy our product," but its lawsuit against Borland is a clear attempt to force Quattro Pro out of the market, or at least to bleed Borland for lawyers' fees.

GOVERNMENT DROPS NEIDORF CASE

The case against Midwestern hacker Craig Neidorf was dropped by the US government after it became clear that their contention that he had stolen something of value was bogus.

The case came to national attention recently when the newly formed Electronic Frontier Foundation took Neidorf's plight to heart and helped support him. Neidorf, the publisher of *PHRACK World News*, a phone hacker's newsletter published online, was accused of publishing a document that was allegedly stolen from BellSouth. BellSouth had told federal prosecutors that the information was proprietary and worth $80,000; during the trial, however, a BellSouth representative admitted that the document (a description of the 911 phone system in the south) was publicly available for $13.

Even though the case was dropped, many people have pointed out that Neidorf, a senior in college, had to spend large amounts of money on defense and that his computer equipment was seized.

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Companies often have very different views of the "low end" of the market. Last month, both Sun and Tandy announced new computers to attract more people at the low end of their markets. Sun's computer, however, is more than ten times as expensive as Tandy's, since Sun's target market is the office that needs workstations and Tandy's is the home that needs a small business computer.

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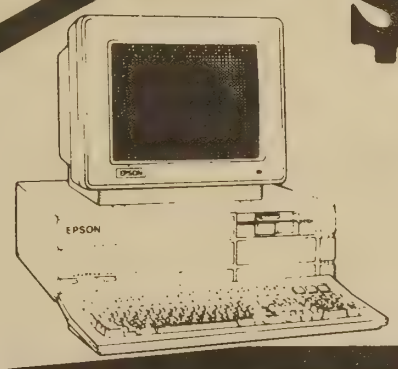

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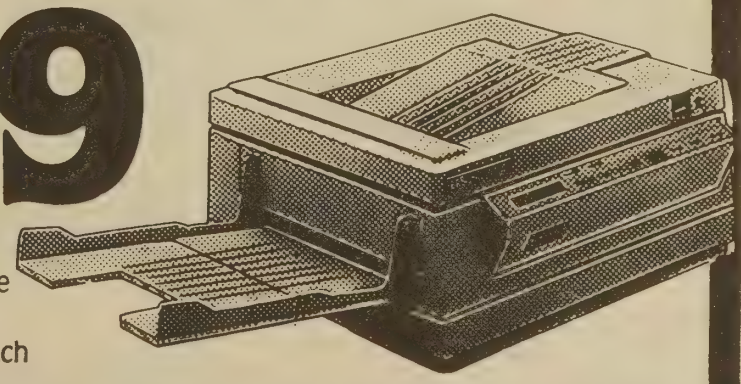

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1000 companies who only think of Intel-based PCs into the "real world of UNIX computing" at a low price. Of course, Sun hopes that, once there, these companies will be attracted to its higher-end models.

In a related announcement, Sun signed agreements with Entre, Connecting Point, MicroAge and NYNEX to sell its computers in retail stores. Like NeXT's agreement with Businessland, this may amount to giving potential Sun customers a convenient place to go kick tires, but it may also turn into a boon for those stores, since they could show off systems with high prices to large customers.

Sun's computer is more than ten times as expensive as Tandy's, since Sun's target market is the office that needs workstations and Tandy's is the home that needs a small business computer.

Tandy's home computer, the 1000RL, competes with IBM's newly announced PS/1. The 1000RL series costs much less than the PS/1, but offers a much slower CPU, less memory, and lower-resolution screen. Even with these defects, Tandy may do much better with the 1000RL than IBM with the PS/1, since it will be available in all Tandy stores where the sales staff need much less training to sell to the home market. Like the PS/1, the 1000RL comes with an easy-to-use interface and most of the applications software that people would want for a home computer.

As an interesting twist, the computer is the first to come with the Good Housekeeping seal of approval.

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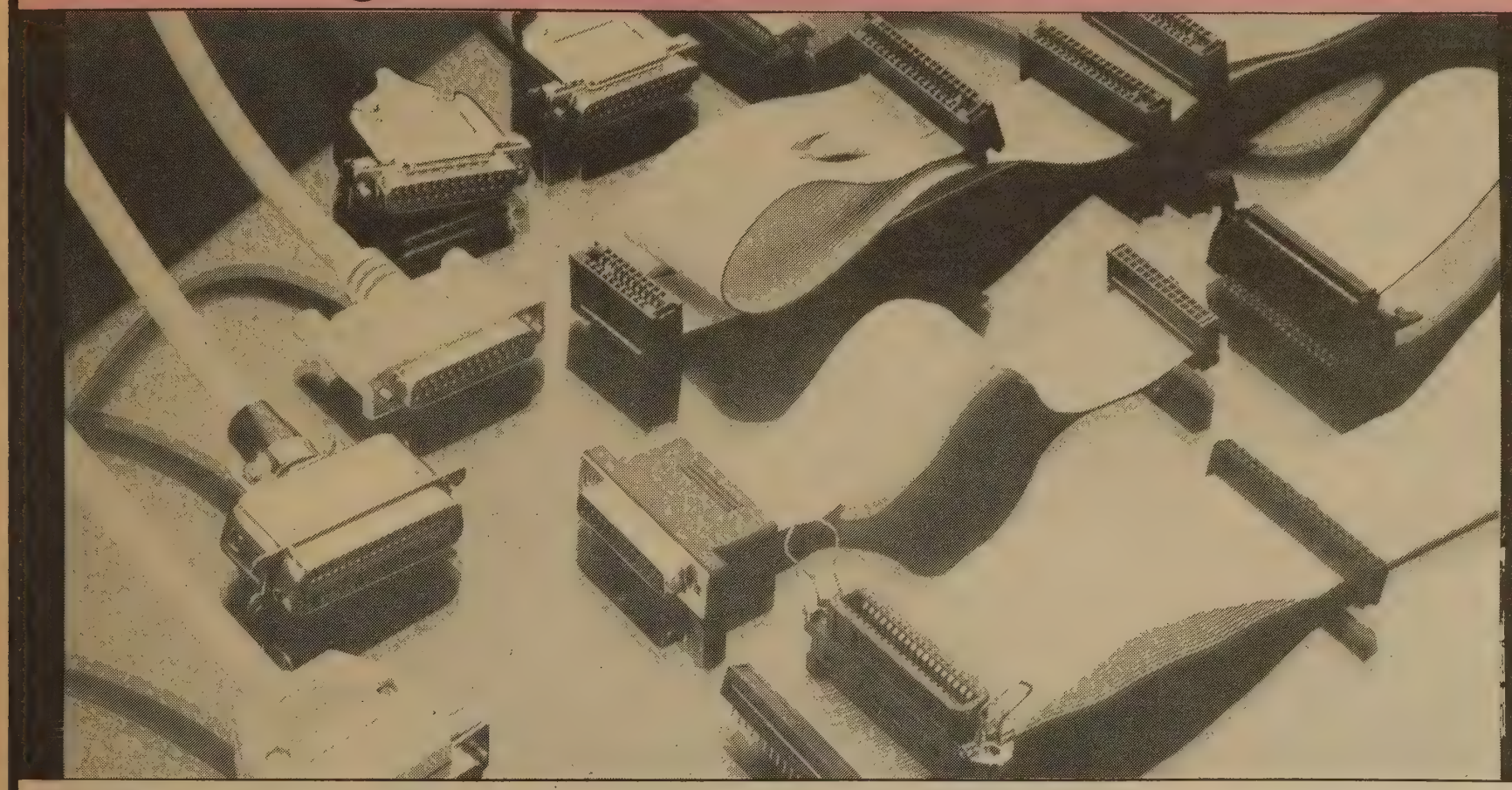

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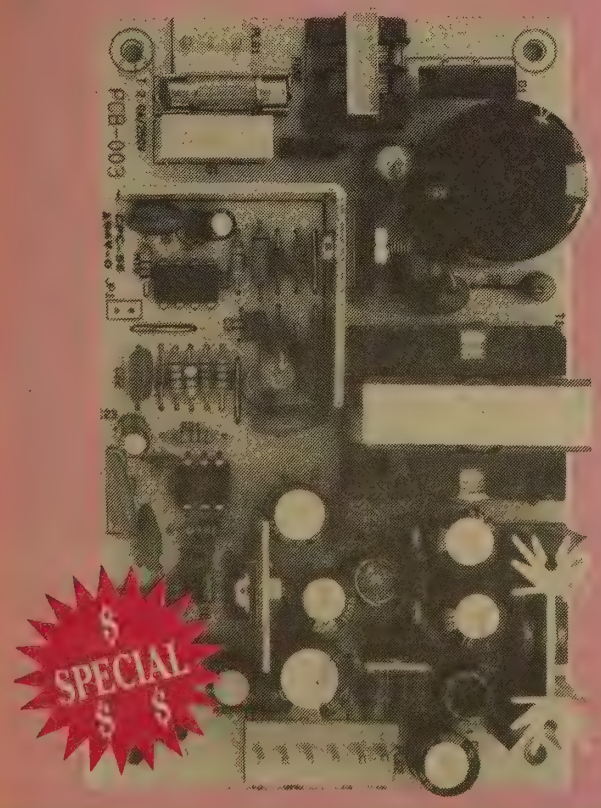

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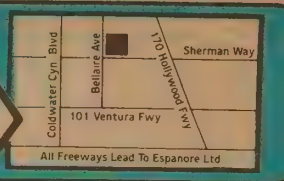

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chance to look at it and decide how important it is for them. The initial speculation that Windows 3 would have a serious effect on the Macintosh market has died down as people see that it is, basically, a Microsoft product steeped in history and burdened by MS-DOS. While using applications under Windows 3 is clearly easier than using standard MS-DOS software, most people would agree that it is still more difficult than using a Macintosh.

The level of similarity between the two environments is deceiving, as many people have discovered. Computer magazines, who said at the rollout that this was the beginning of the end for the Mac, have recently been running "executive surveys" indicating that the release of Windows 3 has, in fact, not affected corporate Mac strategies. In many ways, Windows 3 is not much better than Windows 2, and many large companies knew that well enough ahead of time to not let Windows mania change their long-term buying plans.

One of the biggest disappointments for PC users was that Windows 3 adds such a large overhead that you really need a fast 80386 and at least 2Mb of RAM to make Windows applications seem like they are running "fast." Although you can get such a system for much less than a Mac that runs programs at the same speed, many users' expectations were that they could load it up and go. Those who decided to upgrade their PCs to meet these requirements for Windows 3 came across one of the PC's most notorious features: upgrading is a massive pain in the neck. Upgrades are not standard; the documentation that comes with upgrade hardware is generic and often incorrect for most clones; after hardware upgrades you must diddle with your Autoexec.bat and Config.sys files (if you know what they are); and there is no way to be sure that the upgrade would work on anything but an IBM machine. In other words, it is a scary and frustrating experience.

.Upgrading a Macintosh, on the other hand, is fairly simple. Most users do not want to do the upgrades themselves, and Mac stores usually charge $25 or less for RAM upgrades. If you do it yourself, there is basically only one kind of RAM; it snaps into one kind of slot, and you can tell immediately if it worked. After installing RAM on a Mac, there is no need to alter any files or to "tell" your system what you have

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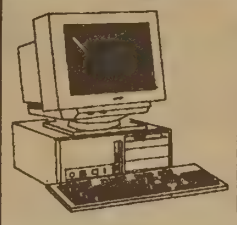

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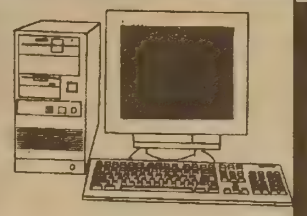

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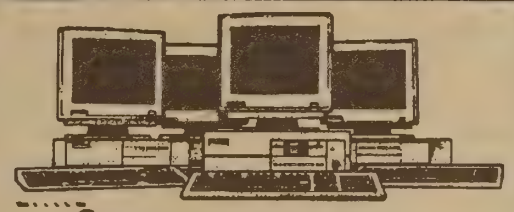

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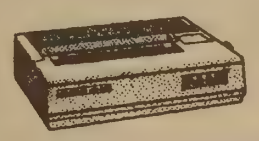

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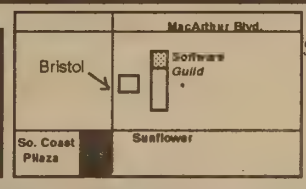

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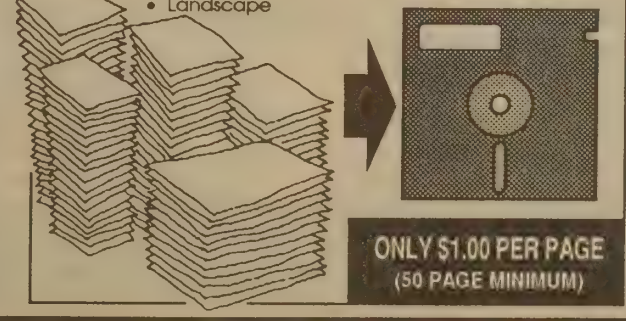

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done.

Once you have upgraded, installing Windows 3 is significantly more difficult than installing the system software on the Mac, particularly for novice users. To set up Windows, you must know a fair amount about the technical specifications of your system; to set up a Mac, you simply copy files. Windows 3 differs significantly from Windows 2 in the way it treats "extended" versus "expanded" RAM memory, and you need to understand the differences in order to set up either version properly. In fact, the way you should set up your RAM for Windows 3 is the opposite of the way that many non-Windows applications want it.

Once you are set up and running, there are fewer differences between Windows 3 and the Macintosh immediately visible. (However, getting to that point is so daunting that many people reported giving up on the installation process.) Once in applications (Windows 3 comes with fairly reasonable word processing, paint, and communications applications), people who rely on keyboard entry become almost immediately frustrated. On the Mac, the standard keyboard equivalents are much easier to remember than they are under Windows. Quitting a program, for example, is Command-Q on the Mac and Alt-F4 on Windows. People used to complain that the standard keystroke for closing a window on a Mac, Command-W, was hard to remember; after they use Ctrl-F4 on Windows, they complain less.

One of the biggest selling points for graphical user interfaces is how easy they are to use, yet it is clearly more difficult to learn Windows applications than it is Macintosh applications. For example, many PageMaker training centers say that it takes almost twice as long to teach a novice PageMaker on Windows, even though the interface is nearly identical. Whenever the interface differs, they find, Windows is almost invariably harder to use.

From an operating systems standpoint, the Mac will probably not loosen Microsoft's grip on the Intel-based PC market. Apple will always be way behind the clone market on hardware price, which turns out to be much more important than Apple has ever publicly acknowledged. You can get a solid Windows-based computer system for about half of what you would pay for a similarly powered Macintosh. With all of its faults, that is still a great deal of money.

Those who decided to upgrade their PCs to meet the requirements for Windows 3 came across one of the PC's most notorious features: upgrading is a massive pain in the neck.

The emergence of Windows 3 does not affect the Macintosh market, except for PC users who haven't used Windows (but hope to) or used a Mac but want to feel better about their choice of inexpensive but hard-to-use hardware. ■

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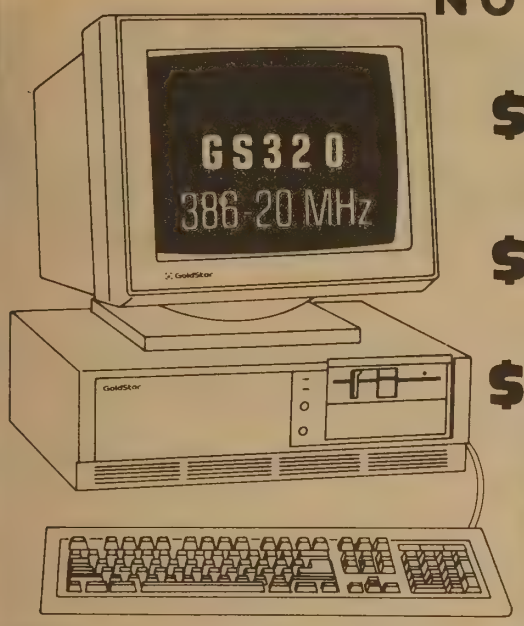

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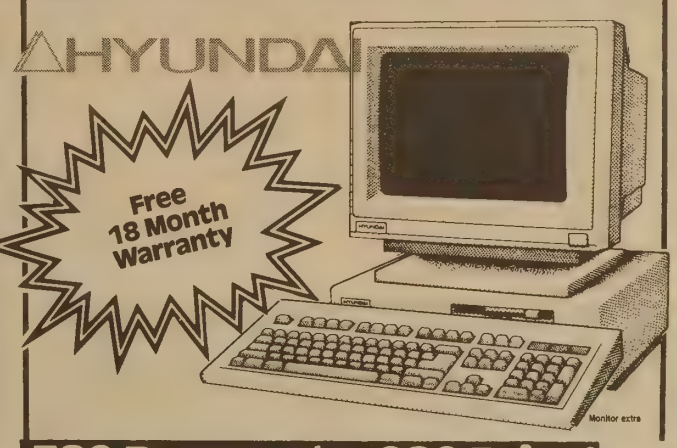

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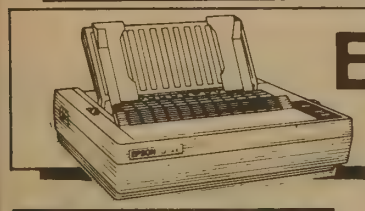

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Across The Electronic Frontier

GUEST EDITORIAL

BY MITCHELL KAPOR AND JOHN PERRY BARLOW

Over the last fifty years, the people of the developed world have begun to cross into a landscape unlike any which humanity has experienced before. It is a region without physical shape or form. It exists, like a standing wave, in the vast web of our electronic communication systems. It consists of electron states, microwaves, magnetic fields, light pulses and thought itself.

It is familiar to most people as the "place" in which a long-distance telephone conversation is held. But it is also the repository for all digital or electronically transferred information, and, as such, it is the venue for most of what is now commerce, industry, and broad-scale human interaction. William Gibson called this Platonic realm "Cyberspace," a name which has some currency among its present inhabitants.

Whatever it is eventually called, it is the homeland of the Information Age, the place where the future is destined to dwell.

CYBERSPACE

In its present condition, Cyberspace is a frontier region, populated by the few hardy technologists who can tolerate the austerity of its savage computer interfaces, incompatible communications protocols, proprietary barricades, cultural and legal ambiguities, and general lack of useful maps or metaphors.

Certainly, the old concepts of property, expression, identity, movement, and context, based as they are on physical manifestations, do not apply succinctly in a world where there can be none.

Sovereignty over this new world is also not well defined. Large institutions already lay claim to large fiefdoms, but most of the actual natives are solitary and independent, sometimes to the point of sociopathy. It is, therefore, a perfect breeding ground for both outlaws and vigilantes.

Most of society has chosen to ignore the existence of this arising domain. Every day millions of people use ATMs and credit cards, place telephone calls, make travel reservations, and access information of limitless variety—all without any perception of the digital machinations behind these transactions.

Our financial, legal, and even physical lives are increasingly dependent on realities of which we have only the dimmest awareness. We have entrusted the basic functions of modern existence to institutions we cannot name, using tools we've never heard of and could not operate if we had.

As communications and data technology continues to change and develop at a pace many times that of society, the inevitable conflicts have begun to occur on the border between Cyberspace and the physical world.

These are taking a wide variety of forms, including (but hardly limited to) the following.

I. LEGAL AND CONSTITUTIONAL QUESTIONS

What is free speech and what is merely data? What is a free press without paper and ink? What is a "place" in a world without tangible dimensions? How does one protect property which has no physical form and can be infinitely and easily reproduced? Can the history of one's personal business affairs properly belong to someone else? Can anyone morally claim to own knowledge itself?

These are just a few of the questions for which neither law nor custom can provide concrete answers. In their absence, law enforcement agencies like the Secret Service and FBI, acting at the disposal of large information corporations, are seeking to create legal precedents which would radically limit Constitutional application to digital media.

The excesses of [the FBI's] Operation Sun Devil are only the beginning of what threatens to become a long, difficult, and philosophically obscure struggle between institutional control and individual liberty.

II. FUTURE SHOCK

Information workers, forced to keep pace with rapidly changing technology, are stuck on "the learning curve of Sisyphus." Increasingly, they find their hard-acquired skills to be obsolete even before they've been fully mastered. To a lesser extent, the same applies to ordinary citizens who correctly feel a lack of control over their own lives and identities.

One result of this is a neo-Luddite resentment of digital technology from which little good can come. Another is a decrease in worker productivity ironically coupled to tools designed to enhance it. Finally, there is a spreading sense of alienation, dislocation, and helplessness in the general presence of which no society can expect to remain healthy.

Law enforcement agencies like the Secret Service and FBI, acting at the disposal of large information corporations, are seeking to create legal precedents which would radically limit Constitutional application to digital media.

This statement was originally read by Mitch Kapor at a press conference announcing the Electronic Frontier Foundation on July 10 in Washington DC. For further information, contact The Electronic Frontier Foundation, One Cambridge Center, Suite 300, Cambridge, MA 02142, 617/577-1385, eff@well.sf.ca.us.

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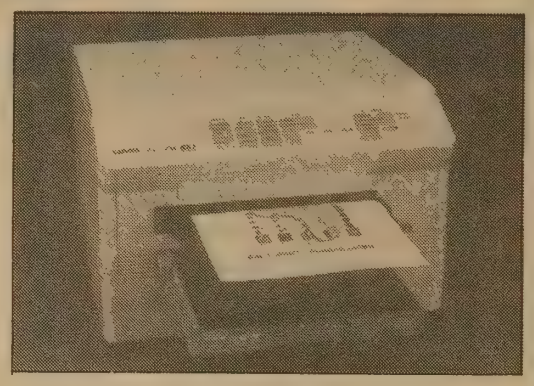

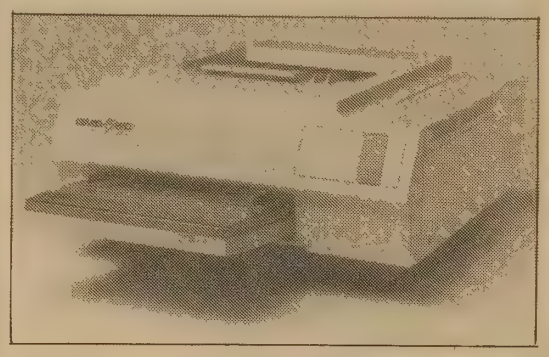

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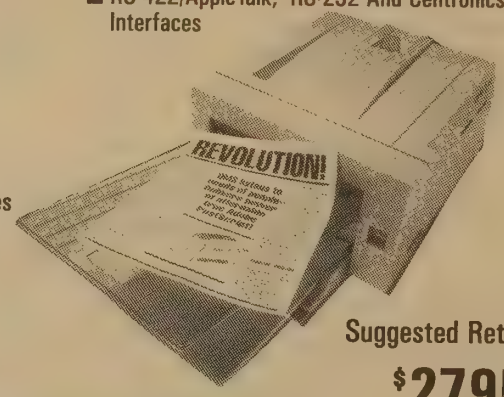

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III. THE "KNOWS" AND THE "KNOW-NOTS"

Modern economies are increasingly divided between those who are comfortable and proficient with digital technology and those who neither understand nor trust it. In essence, this development disenfranchises the latter group, denying them any possibility of citizenship in Cyberspace and, thus, participation in the future.

Furthermore, as policy-makers and elected officials remain relatively ignorant of computers and their uses, they unknowingly abdicate most of their authority to corporate technocrats whose jobs do not include general social responsibility. Elected government is thus replaced by institutions with little real interest beyond their own quarterly profits.

THE ELECTRONIC FRONTIER FOUNDATION

We are founding the Electronic Frontier Foundation to deal with these and related challenges. While our agenda is ambitious to the point of audacity, we don't see much indication that these issues are being given the broad social attention they deserve. We were forced to ask, "If not us, then who?"

In fact, our original objectives were more modest. When we first heard about Operation Sun Devil and other official adventures into the digital realm, we thought that remedy could be derived by simply unleashing a few highly competent Constitutional lawyers upon the government. In essence, we were prepared to fight a few civil libertarian brush fires and go on about our private work.

However, examination of the issues surrounding these government actions revealed that we were dealing with the symptoms of a much larger malady, the collision between Society and Cyberspace.

We have concluded that a cure can lie only in bringing civilization to Cyberspace. Unless a successful effort is made to render that harsh and mysterious terrain suitable for ordinary inhabitants, friction between the two worlds will worsen. Constitutional protections, indeed the perceived legitimacy of representative government itself, might gradually disappear.

We could not allow this to happen unchallenged, and so arises the Elec-

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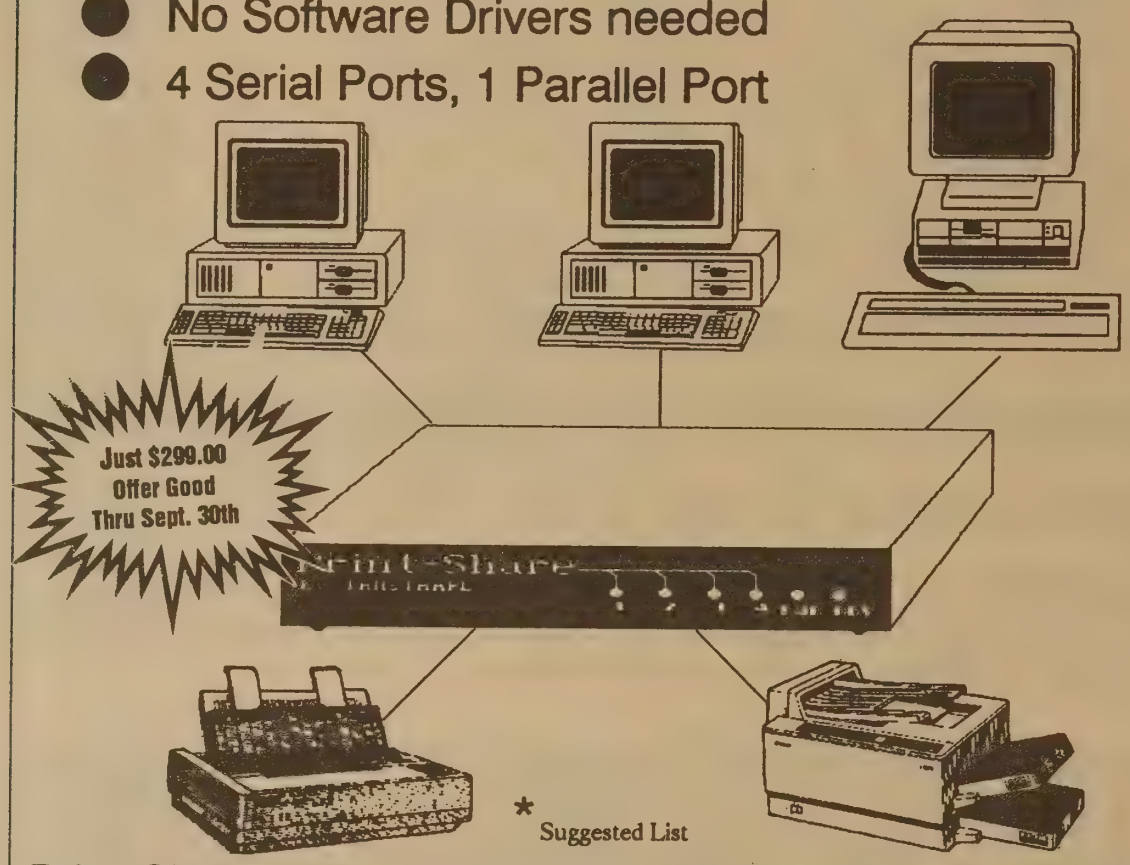

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tronic Frontier Foundation. In addition to our legal interventions on behalf of those whose rights are threatened, we will:

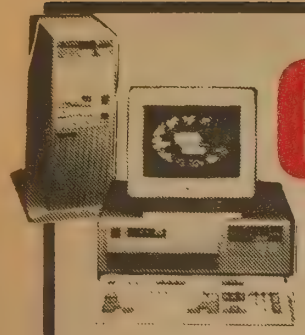
- Engage in and support efforts to educate both the general public and policymakers about the opportunities and challenges posed by developments in computing and telecommunications.
- Encourage communication between the developers of technology, government, corporate officials, and the general public in which we might define the appropriate metaphors and legal concepts for life in Cyberspace.
- And, finally, foster the development of new tools which will endow non-technical users with full and easy access to computer-based telecommunications.

One of us, Mitch Kapor, had already been a vocal advocate of more accessible software design and had given considerable thought to some of the challenges we now intend to meet.

The other, John Perry Barlow, is a relative newcomer to the world of computing (though not to the world of politics) and is well-equipped to act as an emissary between the magicians of technology and the wary populace who must incorporate this magic into their daily lives.

While we expect the Electronic Frontier Foundation to be a creation of some longevity, we hope to avoid the sclerosis which organizations usually develop in their efforts to exist over time. For this reason we will endeavor to remain light and flexible, marshalling intellectual and financial resources to meet specific purposes rather than finding purposes to match our resources. As is appropriate, we will communicate between ourselves and with our constituents largely over the electronic Net, trusting self-distribution and self-organization to a greater extent than would be possible for a more traditional organization.

We readily admit that we have our work cut out for us. However, we are greatly encouraged by the overwhelming and positive response which we have received so far. We hope the Electronic Frontier Foundation can function as a focal point for the many people of good will who wish to settle in a future as abundant and free as the present. ■



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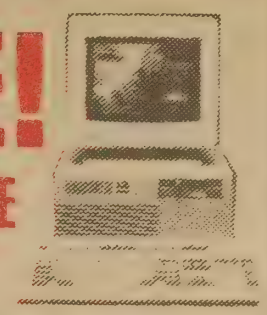

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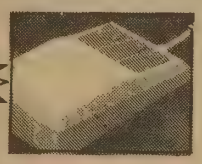

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Increase User Power, Avoid Look-and-Feel Litigation

BY JIM WARREN

Which automobile manufacturer first used the "H" pattern for the transmission shift mechanism? Which furniture maker first offered a chair with four legs? Boy, are *they* gonna clean up, now that Lotus has won its "look-and-feel" litigation!

SIMPLE SOLUTION TO LOOK-'N'-FEEL REPRESSION

There's an almost-trivial solution to this look-and-feel mess: Allow users to configure their user interfaces. This is usually easy to implement, and it gives users very valuable added capability and independence. Here's how:

Keystrokes are used to command and control most computer programs. Such programs—if well designed internally—have a keyboard-input routine with a decision-tree or jump-table that determines how to handle incoming keystrokes—individually and in sequences.

So: Permit the user to define which keystrokes and keystroke-sequences they wish to use for which commands, and their visual representation. Allow the user to implement this through a setup routine that watches for and prohibits ambiguous command sequences.

Software producers could then ship their programs with whatever weird default command-set they choose—giving it a look and feel clearly different from any competitors who prefer litigating rather than innovating. Users can reconfigure the command-set however they desire, whenever they desire.

Software producers might even publish their competitors' command-sets, to aid nontechnical users desiring such configurations. (So far at least, the legal beagles haven't figured out a way to suppress our freedom to *describe* command-sets.)

REALIZABLE FANTASIES

BORLAND'S BEAUTY

When I use keyboard-controlled software—mostly in pre-Mac days—many of my favorite programs are from Borland. Part of the pleasure of using Borland's programs derives from their allowing me to configure as many commands as I desire. This is invaluable, given the PC's chaotic babble of unmemorable, conflicting commands across various applications—by far, the PC's most significant problem, one entirely unresolved by Windows' pretty pictures.

USER-CONFIGURABLE GUIS

In at least several useful ways, such user control over configuration could also be offered for Graphical User Interface—e.g., the Mac desktop, PC Windows, X-Windows, etc. (That could avoid the not-yet-successful look-and-feel litigation over GUIs; more attempted repression is surely coming.) GUI configuration examples:

Allow the user to configure whether they want a one-button or multi-button mouse (sacrilege in many Mac circles), and configure each mouse-button's meaning. Allow them to specify the meaning of one click, two clicks and three clicks, etc. (Contrary to popular belief, the Gods did *not* ordain that "drag" requires holding the button down.)

Allow users to specify keystroke and keystroke-sequences for menu items. Allow them to specify menu type-font, size, location, format, retention ("tear off"), *etc.*

Allowing users to configure command and control functions and representation greatly enhances utility and facilitates defense against consumptive look-and-feel litigation.

MAC WHINES

Mac software publishers: *Please* stop requiring that your products' folders be labeled "<*full product name*> Folder". C'mon folks—a Mac ain't a PC; the icon *shows* that it's a folder. (A "folder" on a Mac is like a subdirectory under MS-DOS. Can you imagine having to name many of your PC subdirectories, "<*product name*> Subdirectory"? Dumb, dumb, dumb!)

It would be glorious if more software publishers documented which file-names and directory-names must remain fixed, versus those the user may change or abbreviate. Allow the latter. (Filenames don't *really* have to include the full product name, plus trademark, plus version number.)

Also, document when a file must be in a specific folder/subdirectory. To the extent possible, let users put 'em where they want 'em.

Copyright © 1990 by Jim Warren. All rights reserved. *Jim Warren founded* InfoWorld, *the DataCast proposal for broadcast-based paperless electronic newspapers, Video Initiative, Wireless Digital, Initiative, Inc. and the nation's largest public microcomputer convention. He was founding host of PBS television's "Computer Chronicles" series, founding editor of* Dr. Dobb's Journal, *founding President of the Microcomputer Industry Trade Association and has chaired various computer professionals' organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics.*

Borland's programs allow me to configure many commands as I desire. This is invaluable, given the PC's chaotic babble of unmemorable, conflicting commands across various applications—by far, the PC's most significant problem, one entirely unresolved by Windows' pretty pictures.

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QUICKIES

Jim Rea's neat database system (Panorama for Macs, from ProVUE, 714/892-8199) includes a surprisingly useful intro/training videotape. As customary with videos, its credit lines list its participants—including "Stunt Typists."

Mail-order megabyte memory SIMMs cost only $70-$100, usually *sans* state taxes. So, why do folks *screech* about major productivity software requiring two megs or more—especially when the software costs $100-$4,000 and computers cost $2,000-$8,000 or more? (Maybe it's 'cause memory's harder to pirate.)

I hear that Sun configuration utilities include one entitled, "SCSI Weird." (After furiously fumbling with numerous combos of cables, terminators, and daisy-chains to get six SCSI devices to mostly work, I better understand why the Small Computer Systems Interface is called, "scuzzy.")

Just for hardware junkies: Have you heard about the new technology referenced in a memo prepared by one Silicon Valley secretary?—"Peach-Handle" semiconductors (say the phrase; imagine the embarrassment).

Students of the University of California at Santa Cruz (I affectionately call it "Uck Suck") have a delightful practice. At the end of a course, if the professor or teaching assistant has been especially good, they applaud. Even nicer, they don't applaud poor or mediocre instruction—thus retaining it as meaningful, earned praise. ■

Which automobile manufacturer first used the "H" pattern for the transmission shift mechanism? Which furniture maker first offered a chair with four legs? Boy, are they gonna clean up, now that Lotus has won its "look-and-feel" litigation!

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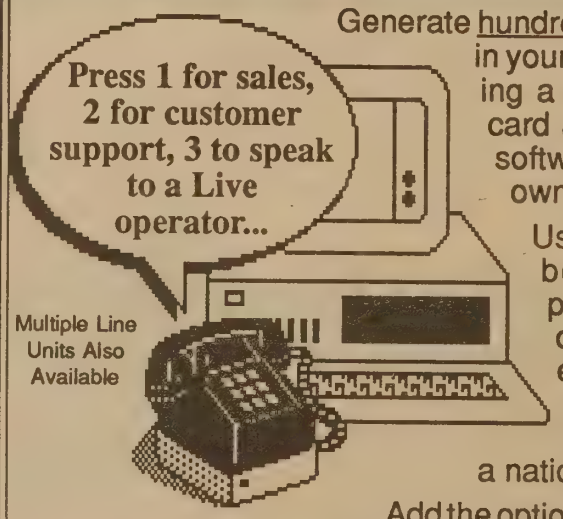

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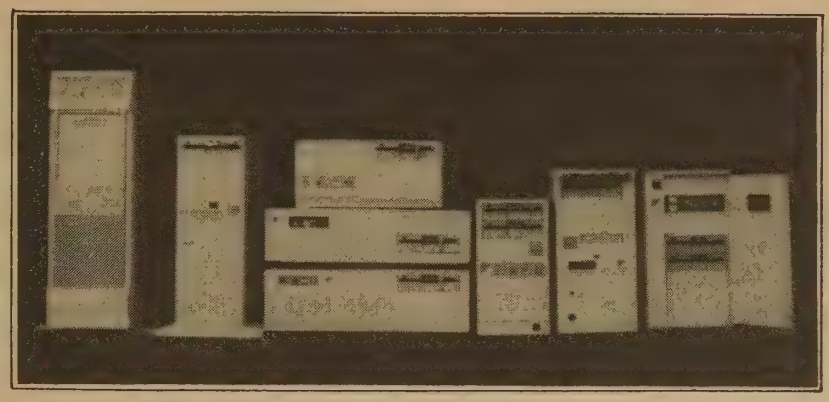

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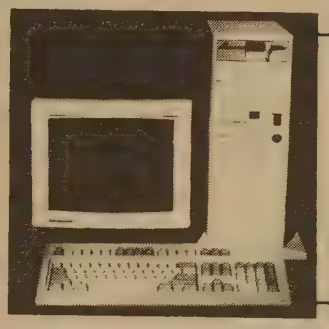

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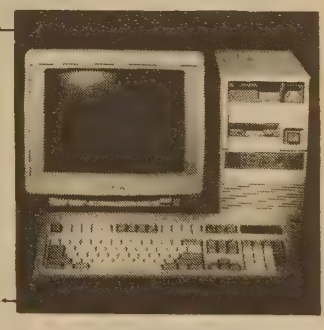

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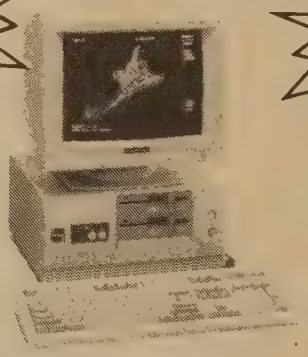

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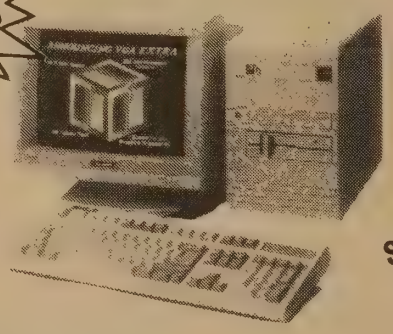

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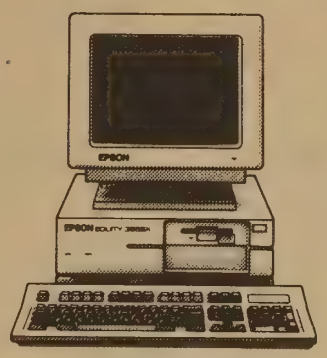

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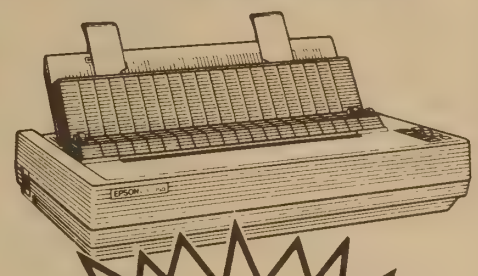

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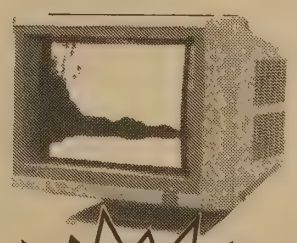

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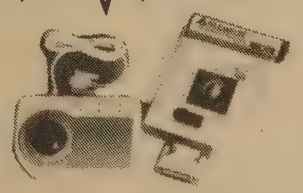

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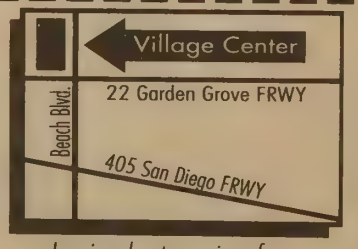

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BUSINESS SOLUTIONS

PC-Based Accounting:

Choosing A Software Package

BY MARGARET WRIGHT, CPA

Accounting software tends to be shrouded in mystery. Not only is information on it not readily available, but potential users often have a hard time figuring out where to go to buy it.

Accounting software is not like other software applications such as spreadsheets or word processing and database managers. If you want a spreadsheet package, you can walk into any software store and walk out with a copy of Lotus 1-2-3 under your arm. If you want to learn how to use Lotus 1-2-3, you can sign up for classes at your junior college or local business school, or you can choose from a vast selection of books. In addition, a small army of consultants will train you and help you set up your spreadsheets.

This is not the case with accounting software. It is not generally available; many software stores don't even carry accounting software. There are very few books available on specific packages, and no training classes offered to the general public on accounting software. Knowledgeable consultants are difficult to find, and until very recently, articles about accounting packages were nonexistent.

FINDING A SOURCE

Part of the reason for this is the way the software is marketed and distributed—which brings us to the nature of the application itself. In order to understand accounting software, you have to know some accounting. Because many businesspeople are not thoroughly versed in accounting, accounting software vendors often feel that the application is too sophisticated to sell to end-users through retail outlets. Instead, each accounting software producer has instituted its own network of "qualified resellers" and "qualified installers," the idea being that end-users need help to set up and use these systems. Each company has its own program to train and provide assistance to qualified resellers and qualified installers to help them become familiar with its products.

Qualified resellers sell accounting software. A reseller may be a software store, a computer consultant, or an accountant. Similarly, qualified installers who set up accounting systems, train users, and provide ongoing assistance to end-users are typically accountants or computer consultants.

Although the reseller and the installer may be one and the same person (or firm), most often they are not. Resellers usually have a general knowledge of the software they sell, whereas the installer should have a thorough knowledge of the software he or she is consulting on. Resellers may sell one or two accounting packages, or as many as a dozen or so. Likewise, installers may consult on only one package or several. Often, a computer consultant or accountant has experience in only one, or at most two accounting packages.

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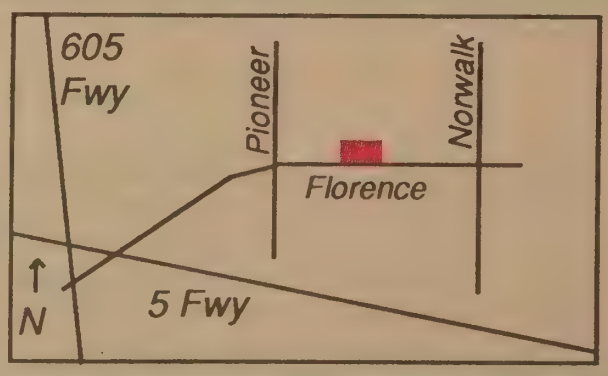

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Abacus II, ACCPAC Plus, CYMA, Data Pro Accounting Series, Great Plains, Macola, MAS90, Open Systems, Platinum, RealWorld, SBT, Solomon III

Note: software in this group is usually sold by module, which runs between $600 to $800 per module. A module is an accounting function such as Accounts Payable or Inventory

Chances are that when the potential user finds an expert to consult, the expert will recommend the product he or she is most familiar with. A few firms have expertise in many packages, and these companies are in a position to help the potential end-user choose the best package for a particular business. Otherwise, the potential end-user must choose the software, find a reseller to sell him the software, and then find a consultant to help him set it up and use it.

So the difficulties of setting up a computer-based accounting system are a function of a complex application with an obscure distribution system. The next question is: where do you begin?

ASSESSING YOUR NEEDS—EVERY BUSINESS IS DIFFERENT

As with any purchase, to get what you want you have to know what you want. Keep in mind that within the guidelines of acceptable accounting practices there are many different ways of getting the job done. Two similar companies in the same industry could have quite different accounting/bookkeeping requirements, in which case different software packages might be appropriate for each of them.

The best place to start is probably in your own file drawers. Your business currently generates three types of output: business forms, which includes such things as invoices, customer statements, purchase orders, and picking tickets; external reports, which include all forms that have to be submitted to governmental agencies and outside authorities such as bank compliance reports and sales, income, and payroll tax reports; and internal reports, for company use only, which give you information to manage your business, such as inventory levels, or aged receivables or payables balances.

Gather together an example of every form and report that your company now produces. These forms and reports all have information on them that must be generated by your prospective accounting software. Analyze the information on the forms and reports, as well as their layout and general appearance. Determine if there are any changes that would improve either the quality of the information or the appearance of the form or report.

Next, determine what other information you'd like to have readily available that you don't have now. Would you like an instant printout of the bills coming due together with a cash projection, or automatic comparisons to budget? Determine exactly what additional information you want, and how you want it to appear.

You are now in a position to start looking for software that will produce the output you want. The only way to get what you need is by doing your homework and asking a lot of questions. Even if you plan to turn the whole computerization over to professionals, only you really know the needs of your business. You are sure to get a better product if you're an informed customer.

After you have a clear understanding of what you want the accounting software to do, try calling around to stores in your area and ask if they carry accounting software packages, and whether they work with outside consultants. You'll be amazed at the different responses you get if you make a dozen calls.

Computer stores that sell accounting software often work with independent consultants. The computer store/independent consultant team can be a winning combination for the business owner trying to computerize his accounting function. This is particularly true if the store and the consultant have been working together for some time. (Keep in mind that, in this business, six months is a long time). Don't be shy about asking for references to satisfied customers.

Consultants come from a variety of backgrounds. In general, most software consultants are either computer specialists who have learned some accounting, or accounting specialists who have learned about computers. In either case, make sure the person working with you knows both. Many CPA firms are adding accounting software consulting to their practices. If you already have a CPA firm, they may consult on microcomputer systems. Be careful though—the fact that a CPA firm does excellent tax or writeup work doesn't mean that they will do excellent computer work. By the same token, just because a computer consultant can re-sector your hard disk, don't assume he or she knows how to design a chart of accounts.

The only way you'll get what you need is by doing your homework and asking a lot of questions. Even if you plan to turn the whole computerization over to professionals, only you really know the needs of your business.

To confuse the issue further, a few of the less expensive accounting packages are sold "over the counter", i.e., without a network of qualified resellers and installers. These packages include a few that sell for under $100, such as Quicken, and a few somewhat more expensive packages, such as Peachtree, DacEasy, and ACCPAC BPI. A computer store salesperson may offer to set up one of these packages for you.

If you have done your initial analysis, and the computer store salesperson can knowledgeably answer your questions about whether the package will do x, y, and z for you, then this may work out for you. However, if anyone tells you that Brand X accounting software will do the job for you without having analyzed the needs of your business, run in the opposite direction.

Remember, there is no accounting software package that does everything for everyone. What matters to you is that the software does the things you want done.

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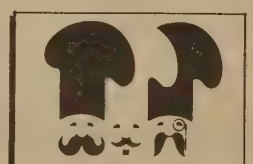

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BUSINESS SOLUTIONS

SOFTWARE CATEGORIES

Accounting software for personal computers can be grouped roughly into four categories based on price (see figure).

Accounting software that costs under $100 is generally easy to use and focuses on your business's checking account. This group of software products will keep track of cash coming in and going out of the account. It is possible to generate a few summary reports that show how much you spent on each type of expense. Quicken is the most popular software in this group.

For the most part, these software products are not double entry systems,

If anyone tells you that Brand X accounting software will do the job for you without having analyzed the needs of your business, run in the opposite direction.

which has advantages and disadvantages. The primary advantage is that you don't have to know a debit from a credit. The disadvantage is that these packages cannot accommodate any but the most simple record-keeping transactions. If your business is very small, and if the most sophisticated financial task you do is keeping track of your cash and filing your taxes, this type of software may be adequate for your needs. For $100 it may not hurt to give it a try.

Most businesses, however, will need more sophisticated accounting software than that available for under $100. The more expensive accounting software packages (those over $100) are all double entry systems. Unfortunately, since all accounting packages attempt to perform most accounting functions, there are no clear, distinguishing features that separate accounting software in the $300 to $600 price range from accounting software that sells for over $600 per module.

It's not possible to make generalizations of the sort, "if you have more than

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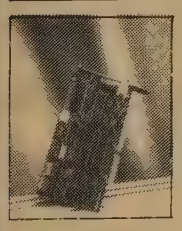

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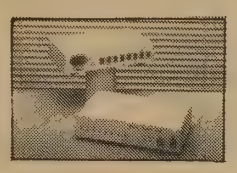

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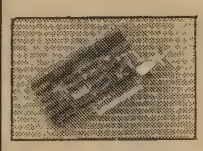
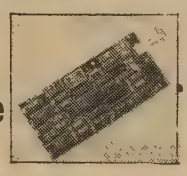


- 8 Bit
- NE-1000
- Compatible



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x number of transactions per month you need software in the $300 to $600 range," or "if you need job cost or inventory, you need to look at accounting packages in the $600 per module and up range." (Of course every rule has its exception. If you need accounting software that runs on a network, you probably need software in the $600 per module and up category, although DacEasy has recently introduced a network package.)

Typically, the more expensive the software, the more likely it is that it will do exactly what you want it to do, and the more likely it is that it will be difficult to set up and learn. Software that can be tailored to fit many different situations must have various options set up just right in order to get the results you want.

With less expensive software you will probably have to change some aspect of your business to accommodate the software. For example, it is unlikely that less expensive software will produce client statements that look exactly like the ones your secretary types now. Less expensive software typically has a standard format for statements, which cannot be changed. If you aren't willing to change the format of your customer statements to the format produced by the software, you may need to look at more expensive software which will allow you to set up customer statements the way you want them to look.

If you pay commissions based on sales, you'll need to know the total amount of sales for each salesperson. To get this information with less expensive software, you may have to set up a separate sales revenue account for sales generated by each salesperson. This contrasts with more expensive software, where you will only need a single sales revenue account.

Another example of changing your business practices to fit the software involves the number of lines per invoice that the system allows. If the system will only allow 20 lines per invoice and you have customers who often order 45 items at a time, are you willing to generate three invoices per 45 item order, or do you absolutely want a single invoice per order? If you want a single invoice per order, you need to keep on looking.

With less expensive software, you often have to rely on setting up accounts to collect the data you need. For example, if you pay commissions based on sales, you'll need to know the total amount of sales for each salesperson. To get this information with less expensive software, you may have to set up a separate sales revenue account for sales generated by each salesperson. This contrasts with more expensive software, where you will only need a single sales revenue account; on the screen where you input the sale, you simply tell the software that salesperson number 6789 should earn a 2% commission on this sale. The software will then generate a sales commission report for you at the end of the period.

Of course, in these three examples the more expensive software sounds much better. However, keep in mind that more expensive is not necessarily better, and, conversely, that less expensive is not necessarily a better deal. What is of utmost importance is that the software fits your particular needs. Going back to the example of the sales commissions, if you only have three salespeople, it may not be worth spending several thousand dollars more in order to get a sales commission report, when setting up three sales accounts will do the job.

ISSUES TO CONSIDER

When you start looking at different software packages, consider the following:

- Do you like the "feel" of the software? Compare a few different packages.
- What kind of telephone support does the software vendor provide to the user? A few vendors provide free or low-priced support, while others charge hefty prices.
- Are the screens functionally the same? Every screen should function the same way as every other. For example, you don't want to have to use the escape key to leave one screen, and Q to leave another. This sort of thing makes software awkward to use and indicates poor design.
- What "add-ons" are available? Some accounting packages that have been around for a while offer third-party software produced and distributed by independent companies that interacts with the basic software package. "Add-ons" typically adapt the software to the needs of a particular industry.
- If the software vendor offers several levels of software, are all the products coordinated with each other? A few firms that offer several levels of software (i.e., less sophisticated, and therefore less expensive, through more expensive and more sophisticated software) have coordinated their different software products so that once a user learns one product, he or she can use other products without having to learn a completely different set of commands. This is particularly important if your strategy is to start with a product in the $300 to $600 range and move up to more sophisticated software as your business requires it. Don't underestimate the amount of time and frustration it takes to become familiar with a software package.

As you have gathered by now, there is no easy way to computerize your business. Don't be discouraged. With a little work and determination, you can have a computer system that fits your needs and works like a charm. Once you have things running smoothly, you'll wonder how you ever managed so long without it. ■

Typically, the more expensive the software, the more likely that it will do exactly what you want, and the more likely that it will be difficult to set up and learn. Software that can be tailored to fit many different situations must have various options set up just right in order to get the results you want.

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BY WAYNE A. YACCO

Network monitors and analyzers are indispensable tools for installing and maintaining networks. They compile statistics, keep audit trails, test hardware, examine packet contents, translate codes, and generate reports. With them you can follow traffic patterns, study work loads, examine and trace transmission errors, and find open or short circuits in the physical network.

LOCAL AREA NETWORKS

Their ability to resolve faults also makes network monitors ideal for developing network-based products such as electronic-mail servers. You can really see what's happening inside the wires. Also, deplorably, they may be required for detecting intrusion attempts or tracing security violations.

If network topologies were static, monitors would be required for their applications in problem solving alone. However, networks are dynamic. They change with changing workloads—and they grow. Therefore, monitors and analyzers are also essential for performance tuning and planning the orderly growth of networks.

The most powerful members of this category are relatively expensive hardware-based tools. Fortunately, there are some less expensive software solutions which are more easily within the reach of smaller installations. They range from approximately $300 to $2,000, a cost equivalent to a few hours of a consultant's time.

Copyright' ' 1990 by Wayne A. Yacco. All rights reserved. *An editor, writer, and consultant specializing in microcomputers and their business applications, Wayne Yacco writes articles, columns, and reviews for many trade and business publications. He can be reached at Box 269, Burbank, CA 91503.*

PC NODES

Right on the cusp, between hardware and software products, is Watchdog Network Monitor from Network General. It is essentially a software product that runs on a PC, but includes an adapter with connectors for both thick and thin Ethernet. This allows the monitor to work concurrently with another Ethernet adapter. A second adapter is required to support a network operating system for two reasons. The Watchdog's own adapter does not include a network BIOS—it is a passive monitor—and it is dedicated to gathering data.

Watchdog can observe and record just about anything happening on a network segment. Notice the word "segment." Watchdog can track activity at any node on a network so long as it is not separated from it by a bridge or router (products which connect similar or dissimilar networks). That is, nodes on a single "segment" of an internet.

Furthermore, most of these monitors are not limited to a single network protocol. Watchdog tracks packets (a message bundle of data, network information, and error-correction code) from any network that runs on Ethernet. Packet types can be IPX/SPX (Novell), IP (TCP), XNS, AARP (AppleTalk), XNS or any other. They can originate from a PC, a Mac, or a workstation.

Watchdog produces statistics on error frequency, frame size, and station, network, and protocol usage. Usage can be reported as either absolute (a percentage of available network capacity) or relative (a percentage of current activity). The adapter's Intel 82586 LAN Coprocessor monitors individual stations or the entire network.

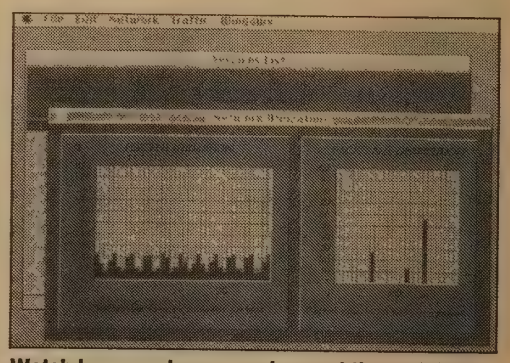
Network parameters include network idle time, percentage of network utilization, number of error frames, and unknown stations. Station parameters include bandwidth utilization, number of error frames, station idle time, and unresponsive stations.

OTHER PHYSICAL LAYERS

Monitors are available for other networks besides Ethernet.

Brightworks offers ARCmonitor+ for ARCnet in addition to an Emonitor+ program for Ethernet. Both are very low cost but also limited. They are designed to work only on single-server LANs, and only with specific cards. Sixteen-bit boards are not supported. A copy of CO/SESSION (which will be covered here next month) is included with each product. It allows the software to be run from a remote location via modem.

Networks are dynamic. They change with changing workloads—and they grow. Monitors and analyzers are essential for performance tuning and planning the orderly growth of networks.



Watchdog can observe and record the activities of any network node.

ARCmonitor+ produces histograms for bandwidth and packets per second. Message activity can also be displayed in a list by node, and node information can be displayed along with a crude node map. The product also includes routines to test network controllers and cable connection between the node and its server. The current version is incompatible with—and a hazard to—NetWare 386.

Emonitor+ does not produce any character graphics, so there are no histograms. However, the program does provide network data capacity, bandwidth usage, and an information-transfer view of header statistics (source, status register, length, error status). Emonitor cannot differentiate packet types. Supported boards are limited to 3COM Etherlink, 3COM 501C, Micom 5210, Micom

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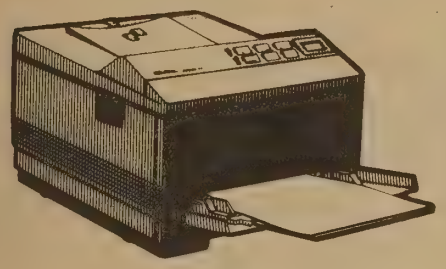

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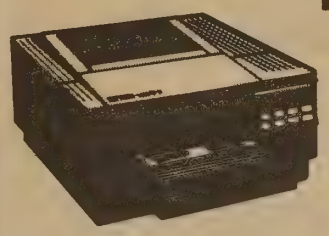

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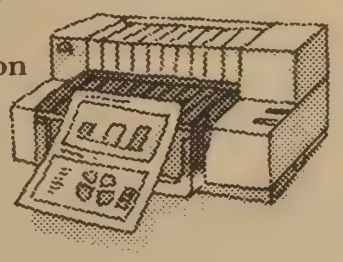

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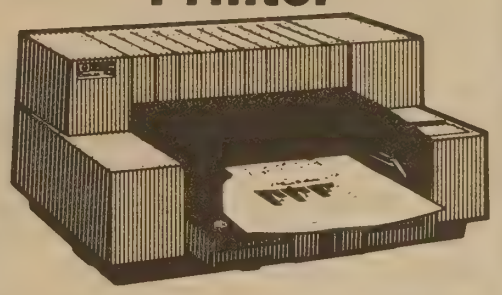

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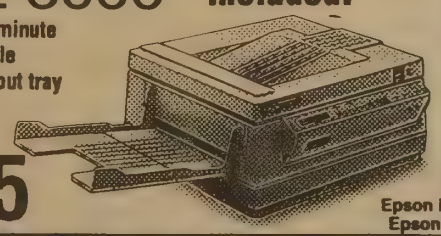

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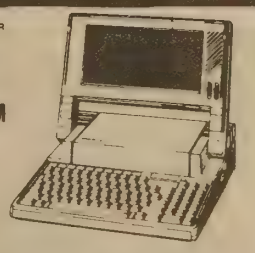

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(415)688-2700

Emonitor+: $295
ARCmonitor+: $295
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Jerral Center West
Tinton Falls, NJ 07724
(800)552-9876
(201)530-0440

PhoneNET Manager's Pack: $995
Farallon Computing, Inc.
2000 Powell St., Suite 600
Emeryville, CA 94608
(415)596-9100

NetMinder Ethernet: $495
Neon Software, Inc.
1009 Oak Hill Rd., Suite 203
Lafayette, CA 94549
(415)283-9771

5010, Novell NE1000, Western Digital 8003E. It also tests cable from node to server but does not test adapters.

MACINTOSH NODES

Similar programs are also available for the Macintosh. By year end, Farallon is expected to begin shipping its network-manager's toolkit: PhoneNET Manager's Pack. These utilities run under either EtherTalk or AppleTalk and some (NetAtlas and CheckNet) even support TokenTalk.

Manager's Pack contains several programs including the following major components:

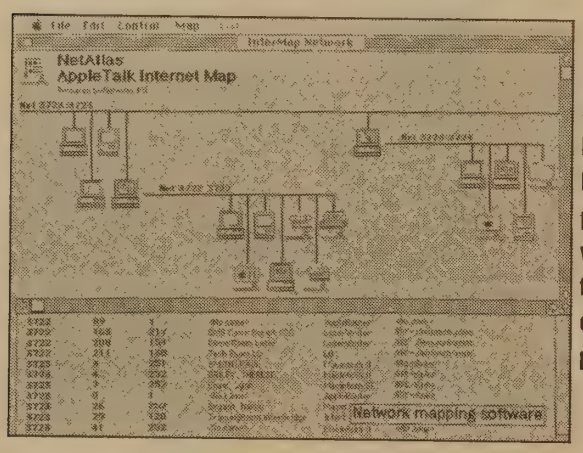
TrafficWatch II analyzes traffic patterns and error rates. It has its own reporting routines, but also includes substantial macros that work with Microsoft Excel. The macros allow data to be used in calculations and then output, using all of Excel's formatting power.

NetAtlas automatically maps the network's logical organization of file servers, mail servers, workstations, routers, and other entities.

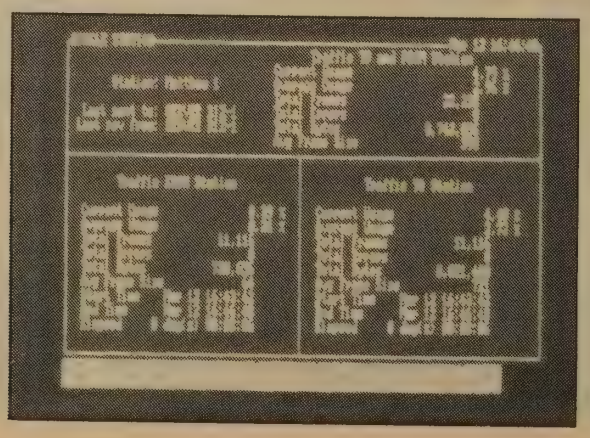
CheckNet searches and reports on all active devices.

NewStats provides continuous graphic monitoring of network traffic and error rates.

StarCommand monitors and controls Farallon's twisted-pair Ethernet StarController.



Farallon's PhoneNET Manager's Pack provides a variety of tools for checking and optimizing performance.



When a network begins to reach the limits of its capacity, or when performance degrades to an unacceptable level for certain tasks, traffic can be analyzed. The analysis will show which users frequently access certain heavily used resources, perhaps a database, and which users generate the most traffic.

Two copies of **Timbuktu 3.1** will provide screen-sharing and file transfer for control of servers and remote user support.

The Farallon bundle will work with any protocol, but it is intended to offer more thorough support for Apple protocols. It will be possible to analyze Apple protocols by packet type while others, such as TCP/IP, will be combined into generic groups. Documentation is scheduled to include video tapes on system-planning and installation techniques.

Neon Software's NetMinder Ethernet also runs on the Macintosh, but has significantly different capabilities from Farallon's offering or the PC-based monitors. In addition to analyzing bandwidth utilization, NetMinder is much more focused on detail. It builds a database of entire packets. You can then search network traffic for any string, such as a data pattern or error packet. Up to five filters can be employed to analyze messages by source/destination addresses or protocol type.

The manual includes format and code information for a variety of packet types and vendors. However, hexadecimal transmissions are automatically converted for several supported packet types including XNS, TCP/IP, UDP/IP, ICMP, ARP, ATP, RTMP, NBP, AARP, and MacIP. Packets from unsupported protocols are displayed in hexadecimal.

This September, support will be expanded to include several others (including two routers): IPX/SPX, DECNet phase IV, DECMOP, Proteon, and Bridge Communications.

Although this software does not include a dedicated adapter like Watchdog, other network tasks cannot be run once NetMinder has been started unless a second network adapter, such as an AppleTalk controller, is installed. It is possible to run other applications which do not require network resources. The program also includes a routine for testing Ethernet boards.

NETWORK EVOLUTION

These products all provide detailed information that can be used to find the source of network errors. They also report usage. That information can be used to make management decisions for planning and growth without guesswork.

For example, when a network begins to reach the limits of its capacity, or when performance degrades to an unacceptable level for certain tasks, traffic can be analyzed. The analysis will show which users frequently access certain heavily used resources, perhaps a database, and which users generate the most traffic.

Users and resources that have a high volume of traffic among them can be split off into a separate network segment and joined to the remainder of the original segment by a router. A few less frequent, low-volume transactions will have to pass across the router with some degradation. However, each network will have increased capacity, and the majority of applications will have improved performance.

True, you could do a study instead—with questionnaires, interviews, best guesses, and other inaccuracies. The cost of the survey alone could outweigh any of the products in this column. The cost of a mistake could add up to unnecessary servers, routers, software licenses... Well, you get the idea.

Next month: more on installation and configuration as this series concludes with a look at remote-control products. ■

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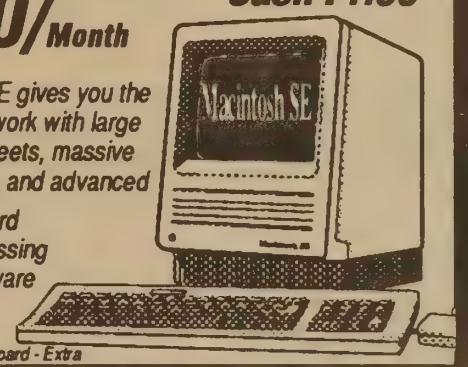

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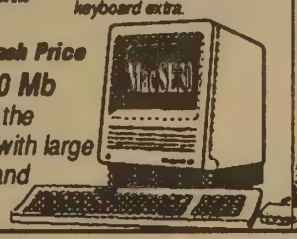

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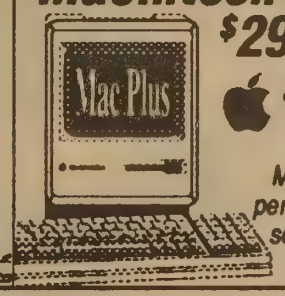

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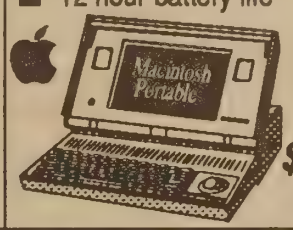

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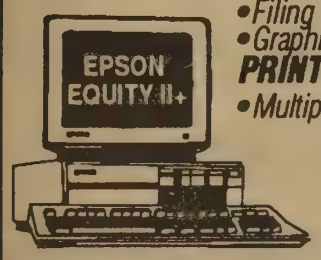

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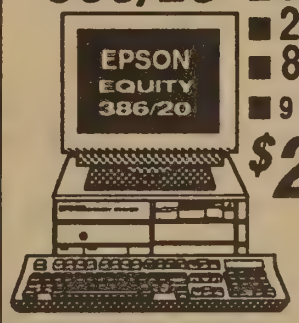

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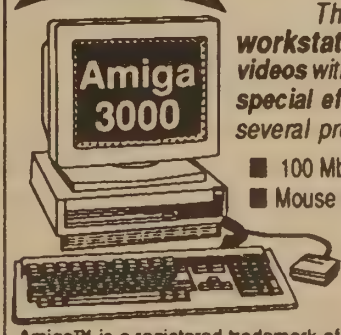

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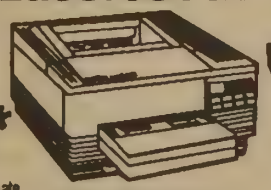
LaserJet III 

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For DOS And OS/2

The Dell 386LT Laptop:
Expandability, Flexibility, Connectivity

BY ED KAHN

The Dell 316LT is a superb computer, competitively priced, with all the features you'll want. It's not a notebook computer, but a full-size 15 lb. clamshell-style portable. While I like the notebook computers, I really prefer to work on the larger units.

This type of machine offers virtually desktop-quality performance with the added ability to take the computer on the road. Extremely well designed, this unit offers expandability, connectivity, and flexibility.

In its least expensive configuration, the Dell 316LT comes with 1Mb of RAM and a 20Mb hard disk for $3199. Different configurations are available all the way up to 8Mb of RAM and a 120Mb hard drive. The central processor of this unit—in any configuration—is an 80386SX chip running at either 8 or 16MHz, which means that you can easily set this system up to run Windows, DESQview, or even OS/2. As a matter of fact, Dell offers you a choice of DOS 3.3 ($99.95), DOS 4.01 ($119) or OS/2 ($299).

From the moment I opened up this package, I liked the computer. It has a black case with a convenient carrying handle that also folds under the unit and gives a nice angle to the keyboard. It has a 3.5" disk drive plus a hard disk.

Wisely for a mail-order house, Dell has designed this computer for a person who does not have a salesman around to walk them through the first steps of setting up the computer. A "Getting Started" booklet tells the complete novice how to begin. Next, a tutorial disk takes you step by step through getting things going. This is especially useful for the real beginner, as the information is presented visually. From there you move on to the full documentation, which is well written and conveniently organized.

When you open the computer, you'll see that the inside of the hinging top contains an LCD display with backlighting. It normally displays black text on a white background; I find this color combination the best for portables. The screen provides VGA resolution which gives a wonderfully clear image. In an office setting, it is simple to attach a VGA color monitor to the 316LT. One particularly nice thing about the Dell setup is that you can completely remove the LCD, which lets you get the unused display completely out of the way when you're using a standalone monitor.

Dell shows the same consideration for the worker in the office setting by accommodating a full-size keyboard. Although the keyboard layout and feel on the computer is as good as any I've seen, I still prefer my full-size keyboard with all the bells and whistles. You can use any PS/2 keyboard by attaching it to the port on the back of the computer. This means that you can use this computer with a separate monitor and keyboard and really have an office system with almost no compromise.

Your only limitation is in the installation of cards. Unlike so many other computers, however, this one does accommodate any standard short ST or AT card. This means you can install a network card. Dell sells an EtherCard ($200) and a modem/fax combination card ($399), and you have many other options.

Dell seems to have designed this computer for a user who will frequently use it as an AC box. They recommend that you not use it on batteries any more than necessary because the nickel-cadmium batteries can be recharged only a limited number of times. They supply an AC adapter, which also serves as a battery charger.

I've never seen a charger designed like this one. If your computer is turned off and you plug in the AC unit, the battery will quick charge in two hours. If, however, the computer is being used, the charger will take eight hours to trickle charge the batteries up to a full charge. Two rechargeable battery packs come with the computer; and you can buy

The Dell 386LT offers laptop/desktop power and convenience.

You can use this computer with a separate monitor and keyboard, and have an office system with almost no compromise.

RESOURCES:

316LT Computer
$3199 to $4299
Dell Computer Corporation
9505 Arboretum Blvd.
Austin, TX 78759-7299
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- DOS 4.01 Windows 386 . . . . . $154

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- Monochrome Monitor
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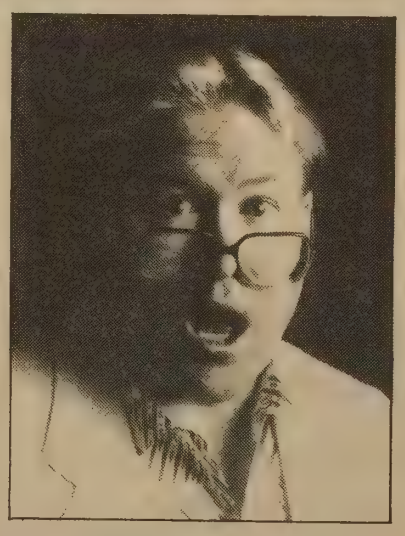

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BUSINESS SOLUTIONS

more should you need them. Dell estimates that they will run the computer for about two hours each.

A particularly nice feature of the 316LT is that when the battery needs to be changed, you don't have to power down and save your files. An internal battery with enough power to run the computer for up to two minutes—more than enough time to change battery packs—takes over.

Dell has packed this computer with energy-saving devices. For instance, a standby switch lets you power down everything except internal memory, which saves most of the power. A touch of the standby button brings the computer back to life and restores you to where you were when you put the unit to sleep. A setup screen allows you to control how long the computer will stay awake when there is no keyboard input. After the predetermined time, the screen, ports and drive will shut down until you call the machine back to action through the touch of a key.

The back of the unit is a cover that protects all of the ports—serial, parallel, monitor, keyboard, expansion, and external drive. Dell has a 1.2Mb 5.25" drive ($349) available. The left side has the battery compartment as well as the power supply port. It also has a reset button; few laptops include this feature.

Dell thought of all the little details to make this a perfect computer. Get it with either a leather ($199) or fabric ($79) carrying case.

Started by a young college student, Dell has made its mark as a mail-order-only supplier of quality computer products. They sell their own products, configured to the specifications of the customer, and backed by their own warranty.

While this is cumbersome and even risky in many mail-order situations, Dell has signed on with Xerox Corporation for nationwide technical support. If you have trouble with one of Dell's products, you can call the local Xerox service center and get immediate help at your location. If you are undecided about Dell products, they are returnable for a full refund within 30 days.

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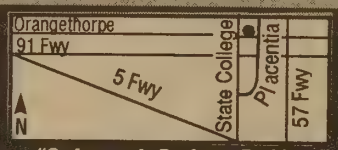

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category is specialty word processors. For some time, I have been playing with Movie Master ($345), a word processor designed for writing screenplays. This is a niche market, but a good deal larger than one might suspect.

In the past, writing a screenplay on a computer involved lots of fancy dancing on the part of the writer. Unlike most writing, screenplays have a rigid format that involves changing margins after almost every sentence. With conventional word processors, this meant creating macros to change margins, move you into caps lock and back again, and center characters' names.

Movie Master simplifies that complexity and does everything through menus and function keys. With the use of **shift**, **control**, and **alt** plus a function key, you have forty dedicated functions. Movie Master blends them into a customized way of getting all of the format requirements of screenwriting. This program beats anything I've ever seen for getting the job done. Characters' names are remembered. A spelling checker ($50) helps you correct spelling errors.

But all of these capabilities still don't wipe away the defects of the program. The spelling checker is weak. The documentation is pretty horrible. Printer drivers do not all work, and some printers I would expect to be supported are left out.

The program is so good that anybody who seriously wants to write a screenplay should get it. But on the other hand, if the creators of this program would use this as a starting point, tie up loose ends and get a writer to prepare the documentation, they would have a great product. ■

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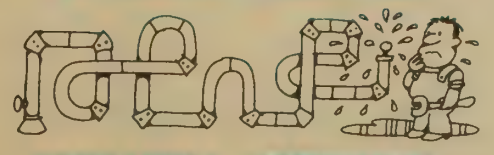

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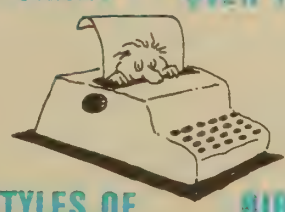

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Using Variables

BY BENNETT FALK

UNIX

The day before yesterday, after the stock market took a dive and the X Windows applications I'd downloaded from USENET refused to compile, I began to think fondly of how variables are handled in the UNIX shells.

Variables make computers worth the trouble. If one thing could not stand for another, and if the value of a thing had to be known before it could be used or even named, programming would be truly hopeless drudgery. Using programs would be no better: the usefulness of any program would be limited to the constants hardcoded into it.

Shell programs of one sort or another have been the basic user interface for UNIX systems. There are three different shells in circulation, and none of them offers a particularly flashy user interface. However, they do contain the basic elements of any programming language, and programming with a UNIX shell is a relatively painless way to learn how to manipulate variables.

The UNIX shells allow variables to be created more or less *ex nihilo*. In the C shell, for example, the user calls a variable into existence simply by assigning a value to a name with the "set" command.

Defining Variables With "set"

In its simplest form, the set command requires only one argument, a variable name

```
set newt
```

creates a variable named newt, but assigns no value to it. The variable exists only for the current shell, and is invisible to other users. When the shell exits, its variables cease to exist.

The set command can also be used to assign a value to a variable:

```
set newt = frog
```

establishes a variable named "newt" whose value is the string "frog". There's no need to declare either the name of the variable or its datatype in advance. The set command creates the variable if it does not already exist and assigns a value to it. If the variable already existed, the new value replaces the old.

The shell distinguishes between the name of a variable and its value. To refer to the value of any variable, simply add a "$" prefix to the name of the variable.

To display the value of the variable newt, use the command "echo $newt" which will return the word "frog" in this example. Trying to print $newt before the variable has been set results in an error message: "newt: Undefined variable." It is possible to test whether or not a variable has been set with the expression "$?newt", which will be 1 if newt has been set and 0 if it has not.

The C shell basically treats the value of any variable as though it were a character string. Consequently, the command

```
set newt = "the quick brown fox"
```

has the intuitively satisfying result of setting the value of newt to "the quick brown fox". Using single quotation marks or parens would work just as well to group the words on the right side of the assignment. Things are a little less satisfying if nothing enforces this grouping:

```
set newt = the quick brown fox
```

is a legitimate command, but it sets newt to "the", the first word in the string and ignores the rest.

It is possible to assign the output of a command to a variable. If the output of "who" is

```
bennett tty02  Jul 25 23:42
root tty01 Jul25 21:43
```

the command "set newt = `who`" stores the output of who in the variable newt. $newt then consists of

```
bennett tty02 Jul 25 23:42 root tty01 Jul 25 21:43
```

Naturally there is an upper limit on the size of the string that can be assigned to a variable. The exact limit will vary from system to system: the maximum for SCO UNIX System V seems to be 507 characters.

WORKING WITH PARTS OF A VARIABLE

The C shell offers some facilities for working with individual words in a variable. For example, "echo $#newt" displays the number of words in the current value of newt, and references to $newt can also be subscripted to isolate individual words in the variable. "echo $newt[1]" prints out the first word in newt's current value. Variable references can

FIG. 1

```
# !/bin/csh
# A crude version of "which" to display the full pathname for
# any command that can be executed from the current search path.

if ($#argv < 1) then
    echo "Usage: $0 command"
    exit(1)
endif

set count = $#path

while ($count > 0)
        if (-e $path[$count]/$1 ) then
                echo $path[$count]/$1
                break
        endif
        @ count = $count - 1
        if ($count == 0) then
        echo "$1 not in $path"
    endif
```

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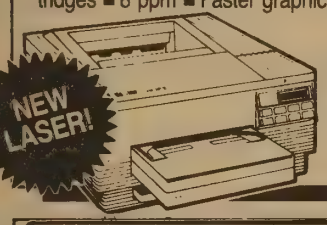

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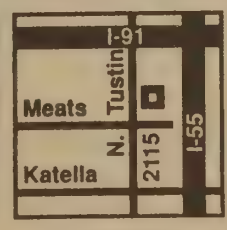

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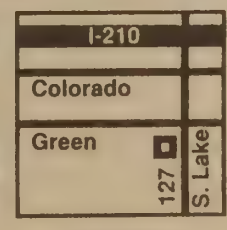

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also be nested, so

```
echo $newt[$#newt]
```

prints out the last word in the current value of newt.

Even though the implicit datatype of shell variables is character, it is possible to perform integer arithmetic on variables whose values are within range. The C shell uses "@" in place of "set" when arithmetic operations are to be performed on variables. The commands

```
set newt = 1
@ newt = $newt + 1
```

set newt to 1 and then increment newt to 2. There can also be multiple words in "numeric" variables:

```
set newt = (1 10 100)
@ sum = $newt[1] + $newt[2] + $newt[3]
```

The value of sum after these commands will be 111.

The "@" command can be used any time the right side of an assignment is a numeric expression.

Using "@" with things that can't be reduced to numeric expressions returns an "Expression syntax" error.

C SHELL AND "WHICH"

The C shell's ability to manipulate variables make it a reasonably powerful programming language. One example of this power is the "which" command that is bundled with Berkeley UNIX. "which" is used to display a full pathname for any command that can be found in the search path. It's useful for identifying which of several versions of a program is being executed. The "which" command is in fact just a shell script of 40 or so lines.

A vastly simplified version of "which" appears in Figure 1. The simplified version doesn't check for aliased commands or for directories whose names satisfy the search criteria, but it does function more or less like the which command included with Berkeley UNIX, and it illustrates how shell variables are used in practice.

There are resources for learning more about shell variables and how they can be used in shell programs. The manual entry for csh (the C shell) is a good starting point, but books like *The UNIX C Shell Field Guide* by Gail and Paul Anderson (Prentice Hall, 1986) and *UNIX Shell Programming* by Stephen Kochan and Patrick Wood (Hayden Book Co., 1985) do the job more thoroughly. ■

The variable exists only for the current shell, and is invisible to other users. When the shell exits, its variables cease to exist.

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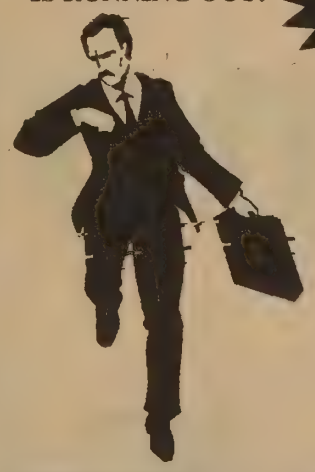

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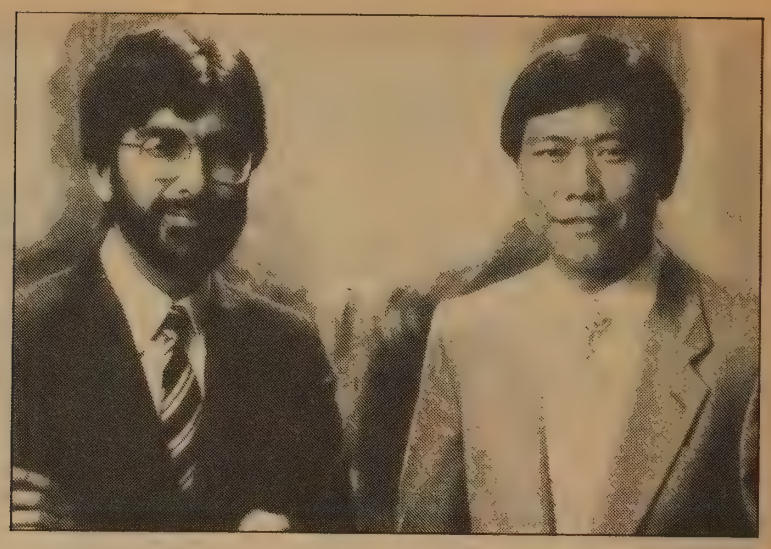

Founders Safi Qureshey And Thomas Yuen On The Transition From Startup Board Vendor To Multinational Systems Supplier

BY WAYNE A. YACCO

Much has changed at AST. For example, two years ago the majority of our revenue was generated by our board-level products. Today, approximately 73% of our revenue is from personal computer systems.

Our business approach has also changed. The enhancement board market is highly reactive, as certain memory and graphics products can be developed and marketed within 10 weeks. In the systems business, deliberation, strategy, disciplined planning and execution are keys to success. Systems products require long-term commitments, longer development and production cycles, and the ability to manage resources and inventory.

In the next three to five years, many analysts predict a tremendous growth in the area of workgroup computing, and AST is positioning itself to advance with this growing technology. By providing high-performance network servers, inexpensive workstation nodes and full-featured connectivity hardware, we have become a complete solutions supplier for this rapidly growing market. This area of business, once dominated by minicomputers, is quickly falling into the realm of powerful personal computers.

—1989 Annual Report, AST Research

Founded in 1980 and once known primarily for its memory-board products, Irvine-based AST Research has made the transition to a manufacturer of complete computer systems. Its customer base includes the likes of Hughes Aircraft, the State of Alaska, General Motors and the Hong Kong Bank. AST computer systems—including a dual-architecture machine aimed at the Japanese on their home turf—are pursuing market share both here and abroad.

The advent of the IBM AT in 1984 foreshadowed a dramatic turn in the memory-board business, and AST had to work hard to find its new place. Along the road, there was even a flirtation with the Macintosh. But COO Thomas Yuen and President/CEO Safi Qureshey, the company's founders, have decided to return to their roots in minicomputer and mainframe technology to deliver real data processing (as opposed to personal computing) capabilities to the desktop. Their target market—those who require powerful business systems.

In a design innovation that distinguishes its hardware from the competition, AST is developing machines with quasipassive backplanes similar to those found in minis. This architecture puts only relatively stable elements on the motherboard; rapidly changing processor technology, and highly interdependent units like memory, have been moved to cards that can be slipped in or out of the bus in minutes. The result is a design that can support multiple processors, or be upgraded at any time. It stands poised to challenge the mini-

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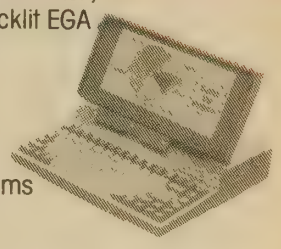

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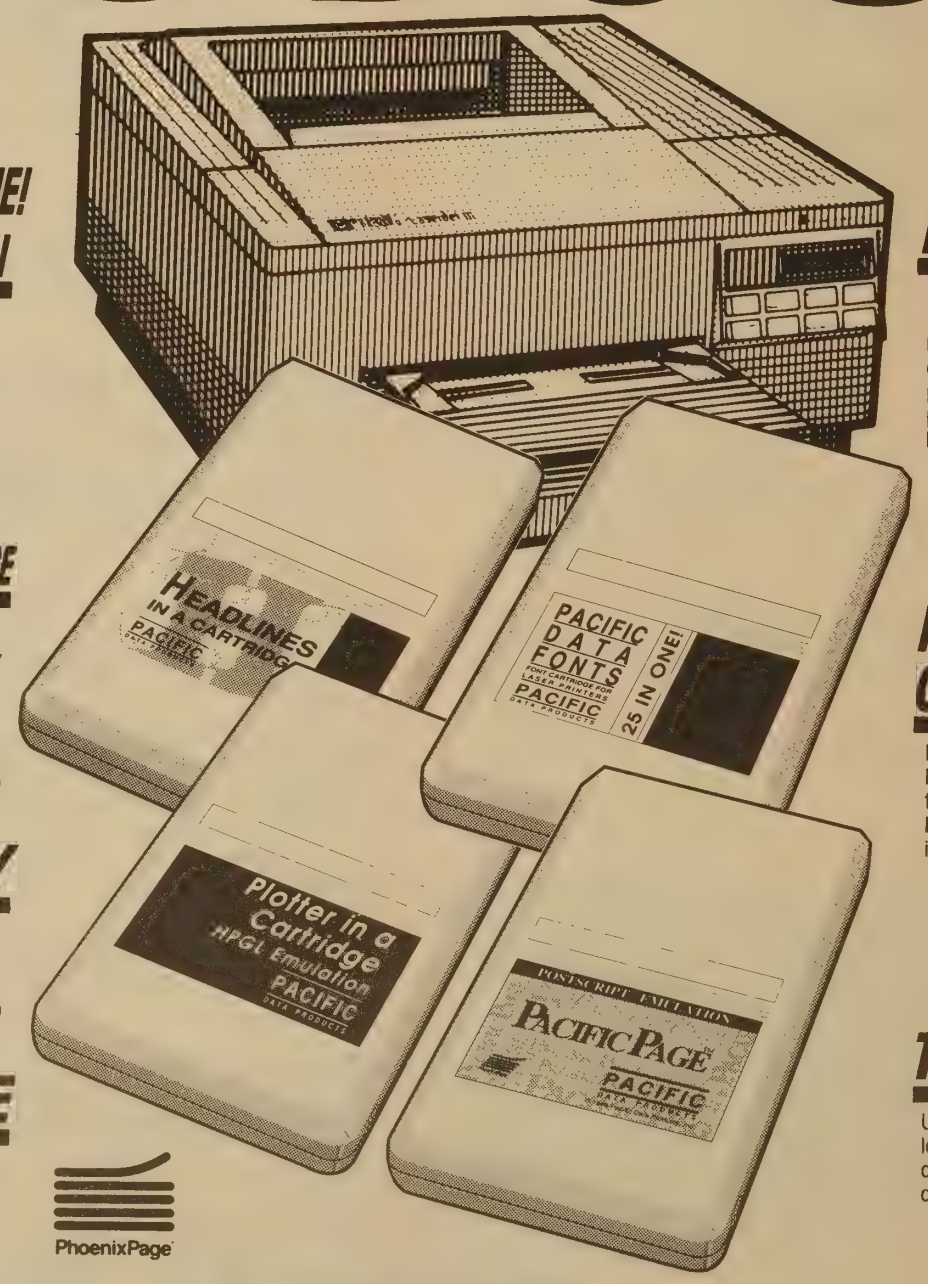

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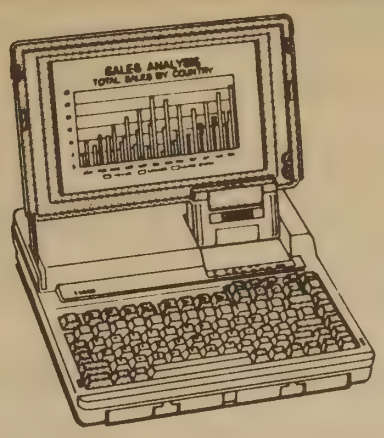

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SAFI QURESHEY:

"Business users look for performance. They look at computers as a long-term investment. We felt that IBM and Compaq—although very good companies—had set up pricing that provided room for a company like AST to come out with competing systems."

computer and eventually, perhaps, the mighty mainframe itself.

In a recent interview at the company's Irvine headquarters, Qureshey and Yuen discussed AST's evolution, the challenges it faces, and its strategy for the future.

AST was once known only for highly reliable board products, particularly the 6-Pak. How did you come to make the transition to complete PC-compatible systems?

Safi Qureshey: The AT came out in August of '84; we entered the computer business in the Fall of '86.

By that time, most of the issues about our industry were very well defined: the role of IBM, the role of standards, compatibility. We knew 1) What were the factors that made companies like Compaq and a few others successful, 2) What were the factors that took care of companies like Eagle, or Columbia Data, or Osborne. We were much better prepared.

Still, its a tougher business now. How were you able to compete?

As many companies have come and gone out of the business, there's an overall consolidation. But AST is completing ten years of business; we're really not a startup from that point of view. We were successful in a very competitive add-on business. Everybody could design a card in their garage, so we were used to competition. We were emphasizing quality, versus emphasizing features, to the business customers. Our focus was always business users of PCs—not home users.

What do business users want that makes them different from home users?

They look for performance. They look at computers as a long-term investment. Performance was there, but price was becoming more important. We felt that IBM and Compaq—although very good companies—had set up pricing that provided room for a company like AST to come out [with competing systems]. The key thing we did, besides coming out with a computer with the right price and the right performance, was to add some new features to the computer.

Didn't the de facto IBM standard stand in your way?

We felt that standards are important, but AST would be able to innovate within the standard.

The passive backplane?

We don't have a passive backplane. We have an active backplane, but we also have a processor plug-in card. The point is to put all of the things that do not change from model to model on the backplane. The standards that have developed in this industry of graphics and desktop systems and serial and parallel ports, the BIOS, they're all on the system board where we are applying very large-scale integration.

Intel comes out every six months with a new processor, a new speed, a new cache—those are on the plug-in card. Each time Intel has a new processor, we just design a new card. The box is already FCC approved, UL approved, CSA approved.

What about memory?

Memory is not on the backplane. Part of the memory is on the processor card and, if the customer needs more memory, on a plug-in memory card.

What are some of the special features you've incorporated into the product line?

Some of the things that we are building are an evolution that will take place over a period of time. One of them is called Common User Access, CUA, which will allow our entire product line to have a common look and feel based on IBM's System Application Architecture [SAA]. Things like that are part of our BIOS and part of our utilities.

Is that implemented only under OS/2?

No, under DOS also. What we're trying to do is give people...a family approach, because somebody may be buying our entry-level product today, but the same user may want to upgrade two years from now.

AST has also made a commitment to EISA, hasn't it?

Yes, we have an EISA product that is shipping.

We understand that the AT doesn't use direct memory access (DMA) for disk access, and that there's some room for getting disk I/O off of the processor. Is EISA going to allow you to make substantial improvements over the AT bus (ISA)?

I think the EISA extension advantage is truly coming in the controller area. We are offering EISA controllers; and network EISA controllers and communications controllers are just becoming available.

Why is AST doing EISA?

The reason we push the EISA standard—speaking for the industry—is MCA [IBM's competing Micro Channel Architecture bus]. That's why there is so much third-party activity to design some of those specialized products. We may sell very few units, but they are available to our customers. So, we are becoming very much a systems company.

So the idea of offering EISA was to avoid domination by IBM and to increase the breadth of the product line for customers who want it. Did you ever cross-license MCA?

Actually we are probably the second company to have a cross license from IBM.

So you're prepared to go into MCA at the point where you see the market demanding it?

The big difference between MCA and EISA—forget the technical aspects, we can say ours runs faster and they can say something else—the big difference from a customer's point of view is that one is open and the other one's closed. That's the only difference.

AST recently introduced a hybrid machine with both IBM and NEC 9800 architecture for sale in Japan.

Thomas Yuen: The NEC standard in Japan is really a software standard. It's really not a hardware standard. Even along the NEC offerings, up and down the scales from 286 to 386 and beyond, there's no common hardware specification.

Yet NEC dominates the Japanese personal computer market?

Yuen: NEC has 75% of the market. They are the de facto standard.

You place a lot of stress on the word "de facto."

Yuen: There's a lot of reality in what we can say about trade barriers. To me, the fact that we are stressing the word "de facto" is that it is not a standard; it is proprietary. And, they [NEC] have taken a very proprietary approach to the industry.

Does that mean it's not using a DOS-based operating system?

Yuen: It's a DOS-based system, but it is modified. It is what they call "Japanized." Actually, in this case it's NEC-corrupted versions, so that you cannot just go and buy any DOS and software. It will not communicate

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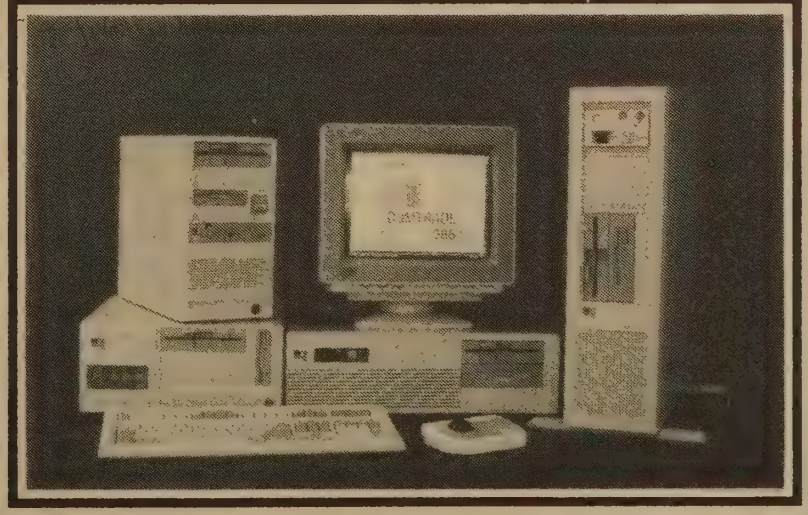

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THOMAS YUEN:

"The reason we're in Japan is multifold. We already have an established channel in Japan selling our current US products to multinationals in the Tokyo area. That group also acted as a liaison group to introduce us to software vendors."

with any of the existing programs.

Is that because of the hardware?

Yuen: Everything is different. The keyboard is Japanized. The command sets are all in Kanji. You turn on the machine and it just runs in Japanese. If you're not Japanese you can't even read it.

How does AST expect to enter a market that many US companies find impenetrable?

Yuen: A lot of people ask us that question. They say, "How big is the risk? Are you going to be able to open the Japan market?" The questions are very simple for us. We've been in Japan for two years now before we launched a product.

The reason we're in Japan is multifold. We already have an established channel in Japan selling our current US products to multinationals in the Tokyo area. That group also acted as a liaison group to introduce us to software vendors.

Is that a Japanese channel?

Yuen: No. It's our own.

A direct-sales effort?

Yuen: Yes. So we have existing dealers and distributors in Japan. If we elect to go slow, we can exploit those relationships.

The problem that everyone always cites with Japan is the chain of distribution, that it's all connected in an old-boy network.

Yuen: In the US we have organized crime. In Japan we have organized business. It's a reality. So, what we have done is we have gone the other way around. In Tokyo there are still a lot of multinationals that are not Japanese controlled. So, we've been kind of going through the back door to open up dealers and distributors that have overlapped business. We don't expect to take the bold, traditional American stance.

Then you're not going through the standard retail channels in Japan?

Yuen: We do, but we do it discreetly. What I mean is, the dealers that are selling our product, the American version, they cannot just make a living selling American product. So they are the overlapped group. You see, in everything there is not just a black-and-white spectrum. There's a grey area.

So there are Japanese dealers you can work with?

Yuen: Especially nowadays. Look at the Japanese influence. Any significant Japanese big company that does not have overseas operations is probably not a very savvy company. So, every Japanese company has some kind of corresponding subsidiaries or something.

Just think about Mitsubishi: How many industries are they in? You can sell to Mitsubishi Auto; you can sell to Mitsubishi Bank; you can sell to anything Mitsubishi—shipping, freight.... If we can just crack one account like that, then you say, "How many of their subsidiaries are overseas?" Probably hundreds, if not thousands, of employees are in that one account.

Why would they choose AST's dual standard over a straight NEC machine?

Yuen: Japan is so real estate-sensitive they cannot afford to have a desk big enough to hold two computers. If I'm a person in charge of international business, I need to run something for day-to-day communication in my office with Japanese guys. But the next thing I would have to do is to fax. I'm not going to waste the desk space for two computers. Why are laptop computers so prevalent in Japan? It's because they're constrained by real estate. Our approach might not be selling just to the real-Japanese Japanese market. Why would they benefit from a dual SX? I'm looking only at the Tokyo area, the Yokohama area—a lot of foreign-affiliated headquarters.

Will your penetration of the Japanese market have any impact here?

Yuen: I have Reuters wanting to buy the dual SX in the US for their Japanese operation. We have the Japanese Grain Exchange wanting to buy the product. We have a Japanese association in Chicago that has 800 affiliate members—these are small-business men in the Chicago area—wanting to buy the product. We have a couple of beta units scheduled to go in to Nissan and Toyota here in the Irvine area. Some government agencies want them. I have interest in this machine from Australia, UK, France, Germany, Brazil also.

How is AST doing in the Far East?

Yuen: We are the number-one market-share holder, ahead of IBM and Compaq combined, in China and Hong Kong. We do close to ten million dollars a month in those two markets alone.

You have a factory in Hong Kong and focus a lot of attention on that market and China. How long has it taken you to become established there?

Yuen: It takes a long time. It took us five years to slowly get the sales up to where we are. The beginning years are very tough, very lean years. It's just like Japan. We hardly expected to do any business in Japan two years ago when we established the subsidiary. Now we're seeing benefits.

The picture you paint of a long-term commitment sounds suspiciously like the Japanese philosophy credited for much of their success in penetrating international markets.

Yuen: The infrastructure we set up around the world too, I mean in the general sense, is why we differentiate ourselves from the other clones. We're not looking for a quick kill.

But some of your competitors are?

Yuen: You can go down the street and look at another company with three letters that starts with "A" also. They've got five people in tech support. They project a bigger-than-life image. How can they run a business? We have 120 in tech support. I think the infrastructure is where we differentiate.

What does that infrastructure consist of?

Yuen: This building alone represents something like a $30 million investment from the company. To create stability, we have our R&D people and a million dollars worth of R&D equipment. "How can you bring timely product to the customer?" is what we continue to strive to get at.

How much do you spend on research?

Qureshey: I think we're spending in the 4%-of-sales range, same as Compaq. But really the key difference is that Compaq is many times bigger. We are using these kinds of things to be innovative in engineering.

Yuen: Aside from these administrative buildings, we have another $20 or $30 million invested in our Fountain Valley factory.

Is all of that atypical of your competitors?

Yuen: Many of the clones, what do they do? They buy boards from a motherboard factory in San Francisco, some XYZDTK boards from Taiwan, slap it together today. Tomorrow it will be another version. That's just not acceptable for the business user. Some consumers can tolerate that. From our point of view, it's important to deliver a consistent product.

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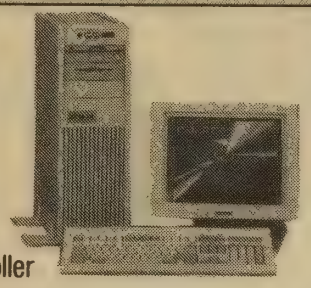

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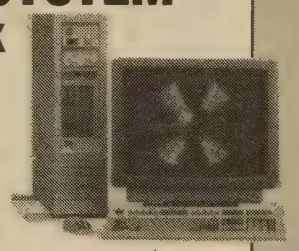

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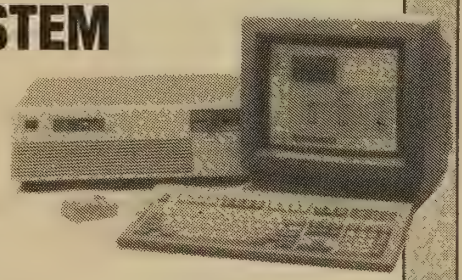

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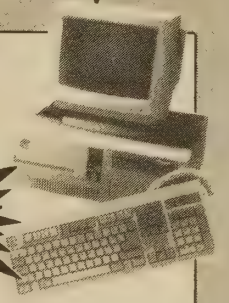

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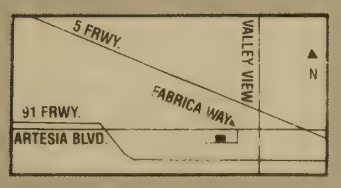

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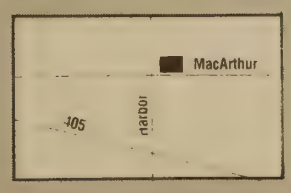

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DESKPRO 286E	1MB MODULE 4MB MODULE	113131-001 113132-001	$ 450 $1,950	$ 164 $ 465
DESKPRO 386/16	1MB KIT 4MB KIT 1-2MB EXP BRD w/1MB 4-8MB EXP BRD w/4MB	108071-001 108072-001 108069-001 108070-001	$ 635 $2,550 $ 650 $2,550	$ 239 $1,248 $ 412 CALL
DESKPRO 386S	1MB MODULE 1MB BOARD 4MB MODULE 4MB BOARD	113646-001 113633-001 112534-001 113634-001	$ 450 $ 650 $1,950 $2,395	$ 164 $ 238 $ 475 $ 595
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PORTABLE 386	1MB KIT 4MB BOARD 4MB EXT BOARD	107651-001 107653-001 107654-001	$ 650 $2,395 $2,395	$ 259 $ 985 $ 985
PORTABLE III	512K KIT 2MB KIT	107331-001 107332-001	$ 269 $1,100	$ 49 $ 325
PORTABLE LTE	512K BOARD 1MB BOARD 2MB BOARD	117077-001 117081-001 117081-002	$ 295 $ 650 $1,250	$ 197 $ 239 $ 385
SLT/286	1MB BOARD	110235-001	$ 650	$ 295
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BRAVO 386SX	512K KIT 2MB KIT	500510-010 500510-002	$ 135 $ 345	$ 65 $ 174
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PREMIUM WS286/WS386SX	512K KIT 2MB KIT	500510-010 500510-002	$ 135 $ 345	$ 65 $ 174
PREMIUM 386SX/16, 386/25	1MB MODULE 1-16MB EXP BOARD	500718-001 500722-004	$ 195	$ 103 $ 562
PREMIUM 386/33	1MB MODULE 1-16MB EXP BOARD	500718-002 500722-004	$ 195	$ 139 $ 562
PREMIUM 386/16,386C	1MB KIT 4MB KIT	500510-007 500510-008	$ 260 $ 675	$ 125 $ 335
PREMIUM 486	2MB MODULE	500718-004	$ 850	$ 323
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EQUITY IIc, 386/20	1MB KIT 1MB KIT 2MB KIT	A808091 A808231 A808101	$ 450 $ 450 $ 995	$ 192 $ 222 $ 321
386SX	1MB KIT 2MB KIT	A808231 A808101	$ 450 $ 995	$ 222 $ 321
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VECTRA QS/20S, RS/25PC	1MB KIT 4MB KIT	D1640A D1642A	$ 595 $2,495	$ 295 $ 583
VECTRA 486PC	2MB KIT 8MB KIT 16MB KIT	Two D2150A Two D2151A	$ 595 $2,495	$ 325 $1,545 $3,993

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LASER JET IIP,III	0MB BOARD 1MB BOARD 2MB BOARD 3MB BOARD 4MB BOARD	H33474B H33475B H33476B H33477B	$ 485 $ 890	$ 117 $ 188 $ 288 $ 358 $ 438
NEC				
POWER MATE 386SX	4-8MB EXP BRD		$2,295	$ 842
TOSHIBA PORTABLE/LAPTOP				
T1000SE	1MB CARD 2MB CARD	PC14-PA8311U PC14-PA8312U	$1,199	$ 478 $ 688
T1600	2MB BOARD	PC8-PA8302U	$1,190	$ 280
T3100	2MB KIT		$1,190	$ 699
T3100E	512K KIT 2MB KIT	PC9-PA8340U PC9-PA8341U	$ 350 $1,190	$ 172 $ 286
T3100SX	2MB BOARD 4MB BOARD	PC15-PA8308U	$ 950	$ 419 $1,088
T3200	3MB BOARD	PC6-PA7137U	$1,590	$ 492
T3200SX	2MB KIT 4MB KIT	PC12-PA8307U	$ 990	$ 286 $ 980
T5100	2MB BOARD	PC7-PA8301U	$1,190	$ 280
T5200/T8500	2MB KIT	PC10-PA8304U	$ 950	$ 286
ZENITH				
Z248	2MB MODULE	Z805-1	$1,299	$ 399
Z386/20,25	1MB MODULE 2MB MODULE 4MB KIT	ZA3600-ME ZA3600-MG ZA3600-MK	$ 899 $1,299 $2,695	$ 146 $ 266 $ 894
SUPERSPORT 286	1MB KIT 1MB BOARD 1MB EXP CARD 4MB KIT	ZA180-66 7PC-16AC ZA180-67		$ 366 $ 288 $ 215 $1,119
SUPERSPORT 386SX	2MB BOARD	ZA180-86		$ 532
TURBOSPORT 386	1MB KIT	ZA3034-ME		$ 369

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DN3500,DN4000 DN4500:	4MB BOARD 8MB BOARD		$3,000 $6,500	$1,680 $2,980
DATA GENERAL				
AVIION SERIES	4MB BOARD		$3,000	$ 780
DEC				
DECStation 2100, DECStation 3100	4MB KIT	MS01-AA	$2,500	$ 859
VAXStation 3100, MicroVAX 3100	8MB BOARD 12MB ADD-ON 12MB EXP BRD 16MB BOARD	MS42-KA MS42-BA MS42-CA	$3,995 $5,995 $5,995 $7,950	$1,567 $2,197 $2,580 $2,980
VT100 TERM. VT100 BOARD	1MB BOARD 1MB MODULE	VX10X-MA VX10X-MD	$ 395 $ 395	$ 319 $ 299
HP WORKSTATION				
HP-9000/200,300	2MB BOARD 4MB BOARD		$2,200 $3,000	$1,080 $1,280
HP-9000/340	4MB BOARD		$3,500	$1,350
SILICON GRAPHICS (IRIS SERIES)				
PERSONAL 4D/20/25	4MB KIT 16MB KIT	H4C04A HU9C16B	$1,650 $7,900	$ 499 $2,641
PROFESSIONAL 4D/40/50/70/80 CS/12 TURBO12/16	4MB KIT 16MB KIT	H4C04B HU9C16B	$1,650 $7,900	$ 499 $2,642
POWER SERIES 4D/120/220/240/280	8MB KIT	H4C08X	$3,900	$1,906
SUN				
3/60,3/80,4/60, SPARC 1	4MB OPTION	X104C,-G,-H	$1,895	$ 825
4/110	16MB OPTION	X116D	$7,700	$2,386
SPARC 4/60, 4/330,4/370	16MB OPTION	X116H	$5,600	$2,783
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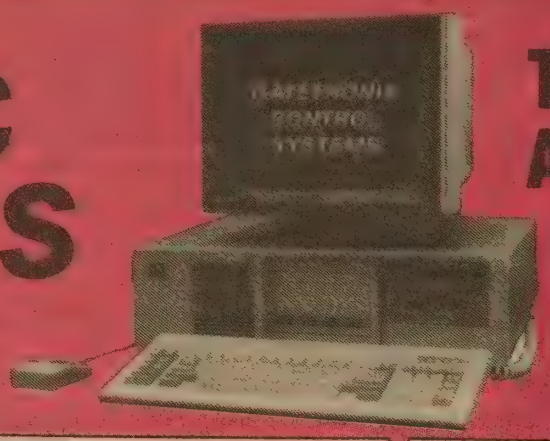

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QURESHEY:

"We put all of the things that do not change from model to model on the backplane. The standards that have developed in this industry—graphics and desktop systems and serial and parallel ports, the BIOS—they're all on the system board where we are applying very large-scale integration."

tors, are they? Wouldn't Everex be a better example?

Yuen: I think Everex's followings are usually attracted to them because of a few benchmark results. I doubt quality was ever the primary reason people ever bought Everex. That is still our guiding fundamental principle in running our business: We've got to give them high quality, high support. I think the return business is the most valuable.

AST has made at least two significant contributions to PC-compatible technology for which it does not seem to have received much recognition. Recently, your Smart Slot has had a substantial influence on EISA. Earlier, you had developed enhanced memory-management concepts for EEMS that your competitors first denounced as incompatible with their own LIM standard and then shamelessly adopted for EMS 4.0. You've been recognized by inclusion in the latest extended memory standard (XMS), but why hasn't AST taken more credit for its innovations?

Qureshey: Like any other industry, there is a lot of background negotiation, politics, that were going into this thing. We have felt that, if we can deliver something good to the customer—we can implement it in hardware, software, whatever—we should try to do it. If we are offering something new which has got some features, but puts tremendous burden on the customer, then we would think about it.

EEMS was that very obvious memory-management enhancement that, to us, was just so obvious that we said, "Implementing it, the customer is not hurt at all." Backwards compatibility was always featured.

That was the point your competitors always emphasized—that EEMS was not compatible—but EMS 4.0 seems to prove that it was by including the same basic changes?

Qureshey: Pretty soon you will see some ads coming out, because our guys in the board business are becoming a little bit more aggressive.

They went out and looked at our Rampage and Intel's AboveBoard, and they have found situations where the Intel AboveBoard hangs up. With, currently, some very popular software.

So they asked me. I said, "Fine, if that truly is the case, you should not be shy."

Half a million or more boards that we have shipped can do all these things. And even the latest Intel board cannot do something we have been doing for five years.

Where is AST headed now?

Qureshey: Our industry is the industry of standards. This is putting tremendous pressure on minicomputer companies and mainframes. They have refused to recognize that.

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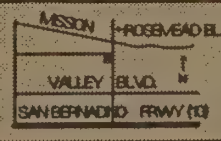

YUEN:

"In the US we have organized crime. In Japan we have organized business. It's a reality. In Tokyo there are still a lot of multinationals that are not Japanese-controlled; we've been going through the back door to open up dealers and distributors that have overlapped business. We don't expect to take the bold, traditional American stance."

But within these standards we want to innovate. We are really saying that you can do a lot of innovation, but still do what the customers like.

You've managed to do that with EEMS and Smart Slot, but not many companies have. What makes you think you can continue to make the right moves?

Qureshey: If you look at our background, it's from large systems. We came out of minicomputers and mainframes before starting AST. To us the cheaper architecture is what the minicomputer guys have sold all along. They buy a big box—they would buy it for fifty users. It can be expanded up to so many hundred users in the same box, and when the customer outgrows that one, he's got to buy a new one. That's the same thing we're offering.

We call our machines the new minicomputers. They can sit on your desk or your desk side. They can go from an entry level SX to a 486/33 by just unplugging the processor right in front of the customer.

If someone wants to upgrade to a 486, can they sell you back the old board?

Qureshey: Yes. That's what we have included in the exchange price.

One of the things people come up and tell us is, "Your 486 is expensive." I say, "Yes, it's expensive today. But if you're going to upgrade two years from now, then the upgrade price will be very low because the 486 will be cheaper."

That's what we have tried to answer. What we are doing for the customer is giving them a choice. You don't have to upgrade; you may be very happy with this machine with 386 or 486 for five years. But if you want to upgrade, you have a choice.

Is that capability growing in importance?

Qureshey: We see a difficulty for some of the customers because the technology is moving very fast: 286, then 386. The 386 has got three different speeds. The 486 has already got two speeds and the third speed is already on the way—50MHz. And then 66MHz. So, we are already working on these things.

So, these machines really will be providing the power of a mini. But isn't there another difference between micros and minis though, in I/O channels?

Qureshey: Yes. We're working on mass storage devices with as many as fourteen drives.

What is the implication for minicomputers then?

Qureshey: We're going to kill them. (AST Research, PO Box 19658, Irvine, CA 92714, 714/863-1333.) ■

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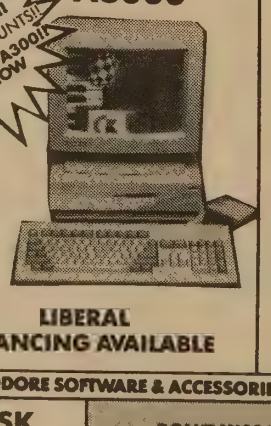

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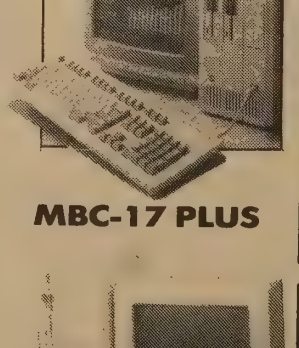

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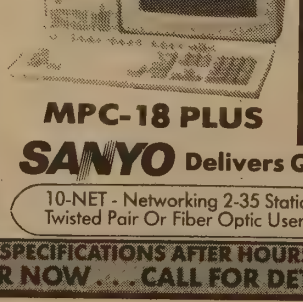

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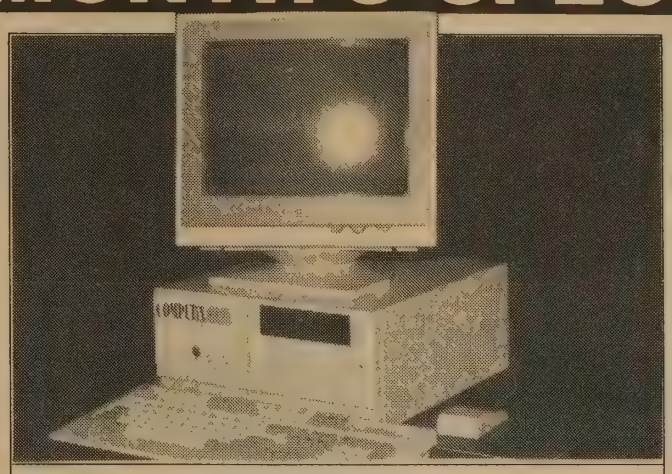

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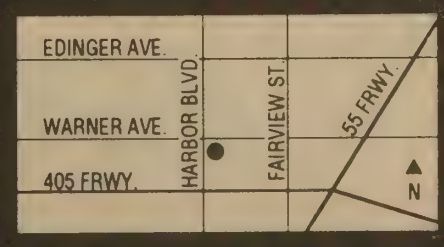


PRODUCT SPOTLIGHT

New Products

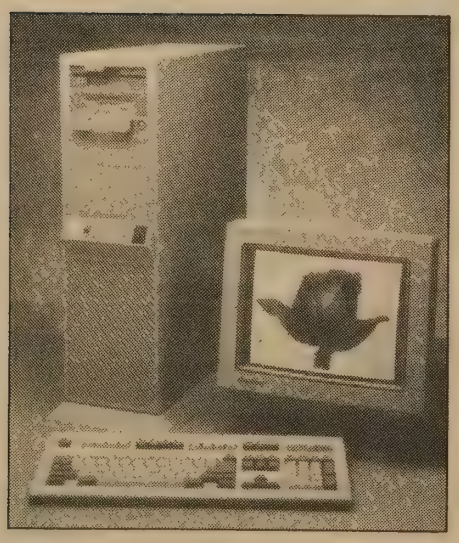
NETWORKS

SAMSUNG ANNOUNCES THE 386A3 FILE SERVER

The Samsung 386A3 is a 33MHz 80386-based file server designed for large networks, high-volume LAN applications, large databases and advanced applications, such as CAD and CAD image libraries. It is fully compatible with Samsung's SE2100 and SE2200 LAN Ethernet interface cards, as well as Novell-certified compatible with all versions of NetWare. The 386A3 includes 4Mb RAM, expandable to 16Mb with the use of a memory upgrade board. It also features eight expansion slots, one 32-bit and seven 16-bit. ($6499) Samsung Information System America, Inc., 3655 North First St., San Jose, CA 95134. 1-800-446-0262.

ROSE HILL FILE SERVERS

Two low-cost, high-performance fault-tolerant file servers from Rose Hill Systems offer a solution to users that requires one hundred percent disk drive fault tolerance for network and system-critical applications. These two systems, the FTS-30 and FTS-80, are designed to optimize Novell NetWare software. This translates into higher caching capabilities, thus reducing the need for extended memory on the file server motherboard. This design also enables the FTS systems to utilize a duplexing, rather than mirroring, storage technique. Rose Hill Systems, Inc., 4865 Scotts Valley Dr., Scotts Valley, CA 95066. (408)428-3871.



MIX-AND-MATCH ON THE CORVUS NETWORK SERVER

Corvus Systems has introduced new software, Omnishare, that allows networks using the Constellation network operating system for Apple II, Macintosh, or IBM

PRODUCT UPDATES

➤ **Aladdin Systems, Inc.** is offering **Stuffit Deluxe 1.0,** Macintosh compression software package. New features include use of multiple compression methods, ultra-fast encryption methods, graphic and sound compression, virus detection functions; and the Unstuffit Deluxe utility. Contact: Aladdin Systems, Inc., Deer Park Center, Suite 23A-171, Aptos, CA 95003. (408)685-9175.

➤ **Concept Development Systems, Inc.** has released an update for **Sparkle**. Version 3.0 allows bridged networks to share resources on a connected local area network, and provides support of intelligent multiport boards. Contact: Concept Development Systems, Inc., Barrett Pkwy., 14-206, PO Drawer 1988, Kennesaw, GA 30144. (404)424-6240.

➤ **eSoft, Inc.** is releasing **Data Base System (tdbs) v1.1,** a modular upgrade of their integrated multiuser information management system. Contact: eSoft, Inc., 15200 E. Girard Ave. Suite 2550, Aurora, CO 80014. (303)699-6565.

➤ **Klynas Engineering** is releasing **Streets on a Disk v4.0.** New features include faster searches for street names and addresses, ability to display all scanned images or other PCX files, new menus, a View command that lets the user display and save up to 15 different screens. Contact: Klynas Engineering, PO Box 499, Simi Valley, CA 93062. (805)583-1029.

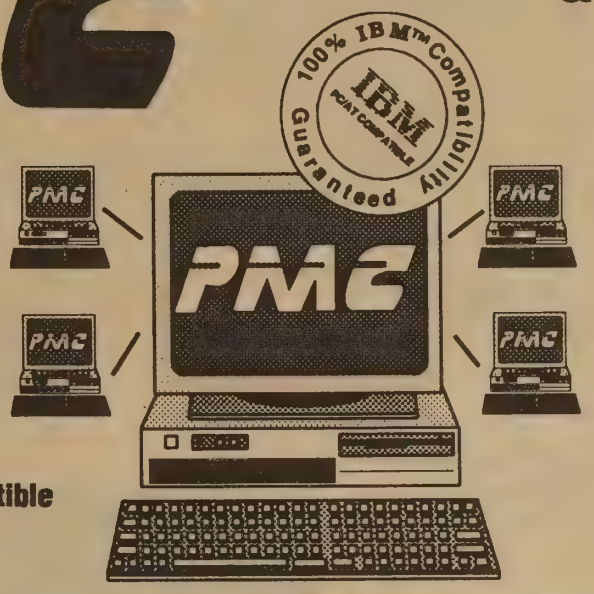
➤ **Irwin Magnetic Systems, Inc.** has announced Release 2.1 of EzTape, its tape backup software. **EzTape 2.1** provides full LAN backup, and expanded support for QIC-38 and QIC-02 tape drives. Registered users of Release 1.1 may obtain upgrades directly from Irwin Customer Service. Contact: Irwin Magnetic Systems, Inc., 2101 Commonwealth Blvd., Ann Arbor, MI 48105. 1-800-421-1879.

➤ **The Lan Support Group, Inc.** has released **BindView v2.1,** a new version of its diagnostic/reporting tool for Novell NetWare. New features include the ability to generate File Server Reports, User Configuration and Resource Utilization Reports and User Group Reports. Contact: The LAN Support Group, Inc., 520 Post Oak Blvd., Suite 100, Houston TX 77027. (713)621-9166.

➤ **Novell, Inc.** has released **NetWare 386 v3.1.** This update offers numerous improvements, including open server APIs, increased reliability, architecture for multi-protocol use, enhanced LAN support, and unprecedented third-party certified support. Contact: Novell, Inc., 122 E. 1700 South, Provo, UT 84606. 1-800-453-1267.

➤ **OCR Systems, Inc.** has announced **ReadRight Personal** as the update to ReadRight 2.01 for hand-held scanners. New features include an omnifont recognition system and page decomposition that automatically separates text from graphics. Contact: OCR Systems, Inc., 1800 Byberry Rd., Suite 1405, Huntington Valley, PA 19006. (215)938-7460.

PMC Computer Systems & Networking Solutions



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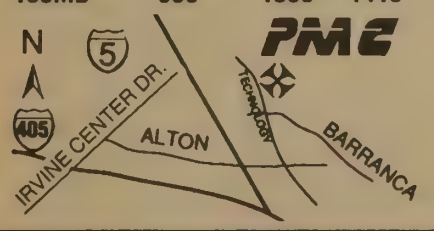

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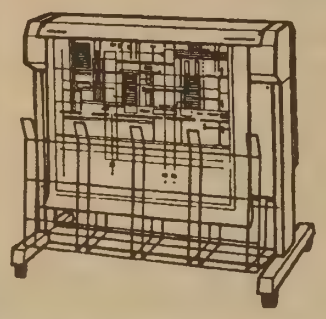

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PRODUCT SPOTLIGHT

to share a single PC server's hard drive. The software is also compatible with other popular PC network operating systems and can be used in conjunction with Novell's NetWare. Omnishare is targeted toward the educational market, where Corvus has a large installed base of Constellation for Apple II users. It can accommodate network storage of up to 256Mb. Corvus Systems, Inc., 160 Great Oaks Blvd., San Jose, CA 95119. (408)281-4100.

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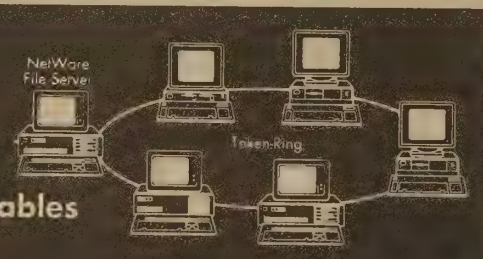

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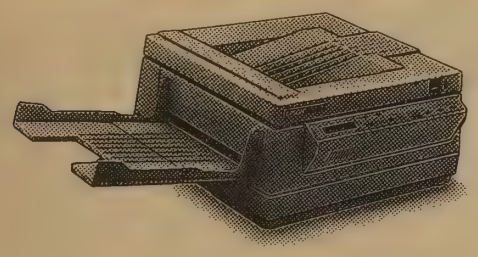

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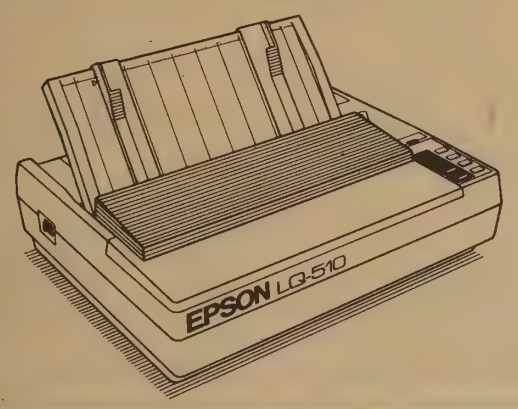

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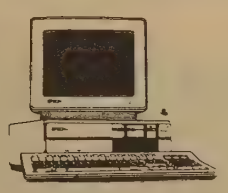

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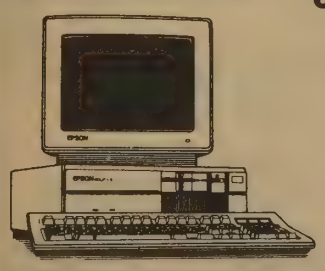

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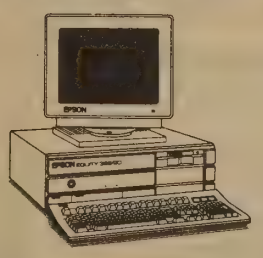

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continued on page 88

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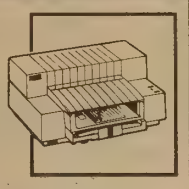

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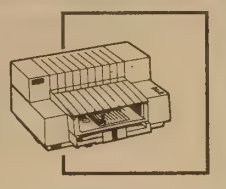

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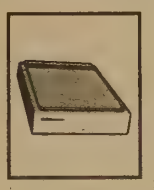

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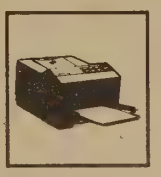

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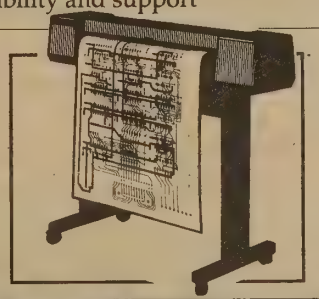

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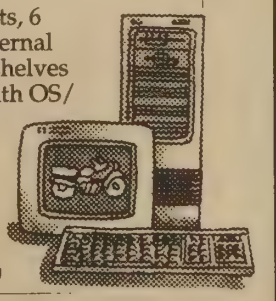

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MIDI And The ST

BY DAVID HAWKINS

The Atari ST has two MIDI ports, which is a real help for those who want to use the ST for music. I've never written about MIDI in the past because I don't know much about music, but thanks to the Diablo Valley Atari Computer Enthusiasts (DACE) users group, I had a very informative conversation with Dan Galant, who's something of an expert on music and the ST.

ATARIST

If you want to learn more about music on the ST and about programs that are available, check with your local Atari user group. Someone with the group is probably working in music and might even play some music for you.

AVAILABLE SOFTWARE

There's a wide variety of music programs available for the ST. Some are sequencers, and are used to manipulate sounds. They allow you to pick the note and modify it on the computer screen before it is played. You can also change the handling of the notes throughout the musical piece. Notation programs take the sounds and put them into musical notation, when you want to print up a copy for other musicians to play from.

There are programs that combine some of the above abilities. For example, Notator from C-Lab is both a sequencer and a notation program. I used to think that some of the flight simulator games were complex, but it's amazing what someone can do with some of these music programs!

Also available are editing and librarian programs. Editing programs allow you to modify the sound in particular ways. The librarian program lets you store the different sounds you create—often thousands of individual sounds.

A lot of companies offer MIDI software for the ST. If you're interested in a sequencer, for example, you might want to check with a dealer or at a user group for recommendations. There are also magazine articles comparing a lot of the sequencers that are available.

In general, if you're new to the music/MIDI world, you might want to start with the programs from Hybrid Arts, since they are more designed for beginners and are less expensive. After you have some experience, you might want to look at the other programs, which have more features. Good programs are available from C-Lab and Dr. T's.

THEN THERE'S HARDWARE

What can you hook up to the ST? Any device that is equipped with a MIDI interface. It's even possible to daisy-chain a number of MIDI-equipped devices together and connect to the Atari.

One of the first pieces of equipment is a synthesizer. This lets you create sounds, which you can play with, edit, and store. You can get a synthesizer with a keyboard, or get a keyboard separately.

You can also add a drum machine. While you can do drum sounds with a synthesizer, it's helpful to have a device just for that one task. You may want a multi-track recorder at some point. There's quite a range of devices that have MIDI connections. Check with a local music store to see some of what is available.

This was probably obvious to everyone but me, but you'll need to hook all this up to speakers or headphones. I used to listen to music programs on the ST and wonder what the excitement was about. The speaker that's built into the monitor is not the best for listening to complex music.

WHAT ELSE?

There's still the hard part—to use MIDI on the ST, you'll still need to learn something about music. It is possible to compose, arrange, and record music at the professional level on the ST, but there's a certain amount of work that goes into learning it all first...

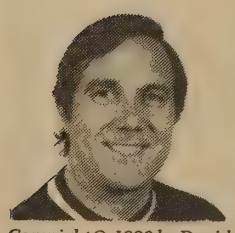
MORE READING

Various magazines that specialize in the Atari carry articles about MIDI and software and hardware on a regular basis. Also, for more information about the whole world of music and computers, check out *Electronic Musician* magazine.

QUOTE FOR THE MONTH

"All music jars when the soul's out of tune."

—Miguel de Cervantes



Copyright© 1990 by David Hawkins. All rights reserved. David Hawkins is the host of the Atari conference on The WELL (415/332-6106); send email to dhawk. He has one of the first Atari ST 1040s sold in San Francisco. Both monitors, an Okimate 20 color printer, and disks are all over the room.

A lot of companies offer MIDI software for the ST. If you're interested in a sequencer, for example, you might want to check with a dealer or at a user group for recommendations.

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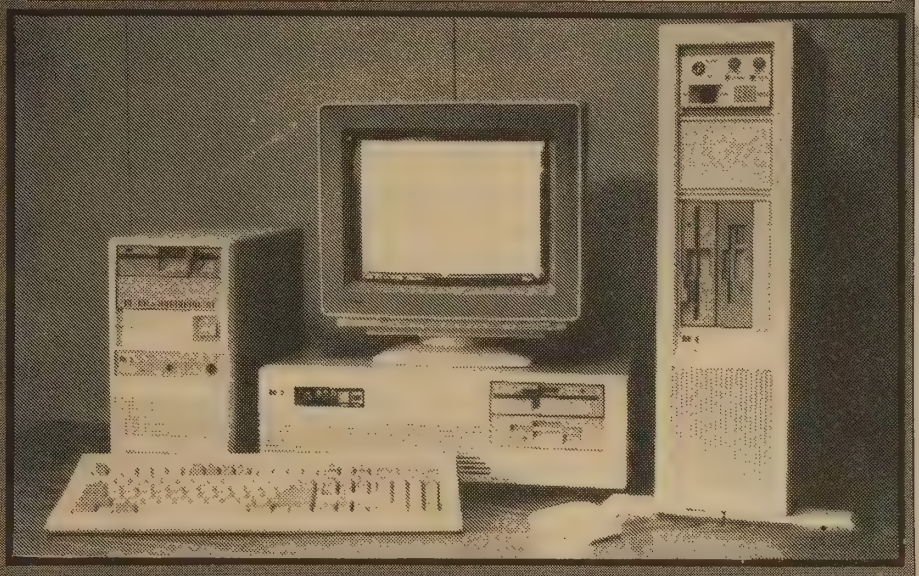

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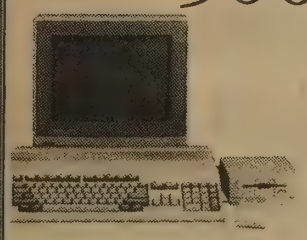

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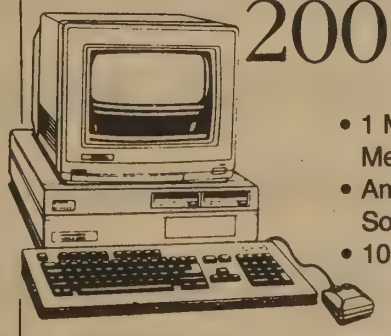

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Inside The A3000: RAM Upgrades

BY MATTHEW LEEDS

AMIGA

Often fables and myths take the form of cautionary tales, presenting a subtle warning to those who pay attention. In the high tech world, online services offer an abundance of stories that start out, "I didn't bother to read the manual..." or "it seemed like the logical thing to do at the time." User groups are another hotbed of such stories, generally told with great gusto, and either much pleasure over some other person's misfortune, or with some degree of chagrin over the teller's tribulations.

This was brought to mind recently while listening to a proud new A3000 owner's tale of woe over his attempts to install some very expensive RAM chips into his machine.

The A3000 will accept a confusing variety of different chips, of differing physical configurations, size, and performance. It also uses an unusual layout for the sockets that the chips are inserted into. All of the details and instructions are in the manual, but then, who reads manuals?

RAM AND THE A3000

There are two basic differences in the possible chips that most users will be adding. The first is the memory size of the chips, either 256Kbit or 1Mbit. The second is whether they are page mode or static column mode (SCRAM). I'll explain this shortly, but first I'd just like to suggest that if you ever find yourself about to add RAM to the motherboard of an A3000, first take a few moments to read the manual. Notice that unless you are adding 32 chips, you need to pay attention to which sockets the chips go into (they don't go in the order you might expect), and use some caution when applying force to seat the chips.

Copyright© 1990. All rights reserved. *Matthew Leeds has been involved in the high tech field since he blew up his bedroom playing with a children's chemistry kit. He has been using Commodore computers since 1982 and has a strong interest in photography, video, graphics, and related fields.*

The A3000 is a 32-bit bus machine; it addresses memory 32 bits at a time. If it read one bit from a chip, you would need to add memory in sets of 32 chips, which would limit the possible memory configurations. By using chips that can be read four bits at a time, you can add memory in 8-chip increments. Such chips are known as "by fours," (256x4 or 1x4).

RAM chips can be thought of as postal boxes, each holding a single value. To read the value in a specific box, the system sends the row and column address of the box it wants to query, and the value is returned. Each box, or address, must be queried in turn to read a set of values. This is how standard RAM chips work.

SCRAM retains the column part of the address for the next several addresses. This means that only the row needs to be sent for each address, and this shortens the amount of time it takes to read a set of values from a contiguous set of addresses.

The 68030 used in the A3000 does not specifically understand about static column RAM, but it does have a special mode called "BURST", in which it will supply only a single address and then ask for up to the next three addresses in turn without supplying additional addresses. A special custom chip in the A3000 called "Ramsey" provides the interface support between SCRAM and the 68030. If the data requested by the 68030 is in sequential addresses, then large numbers of cycles can be saved and performance will greatly improve.

This does require that the program requesting the data store its data in sequential order. Well-written software will do so. There is, however, no way for the casual user to know if a specific program does this, or scatters data.

Back to the first difference. The A3000 will accept either 256x4 or 1x4 chips. Since you must install chips in sets of eight, eight 256x4 chips will add 1MB of memory to your machine, and eight 1x4 chips will add 4MB of memory. There are 32 sockets for chips; this allows a maximum of 4MB of 256x4 chips or 16MB of 1x4 chips to be added to the fast RAM banks (there is room for 1MB of chip memory in the chip RAM banks, but that's a story for another time).

The A3000 uses an odd type of RAM chip for its fast RAM. Users of MS-DOS clones may be familiar with DIP (dual inline package)

The A3000 will accept a confusing variety of different chips, of differing physical configurations, size, and performance. It also uses an unusual layout for the sockets that the chips are inserted into. All of the details and instructions are in the manual, but then, who reads manuals?

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chips. These look like insects with pairs of legs on either side of the black plastic body. Mac users will probably only recognize SIMMs (single inline memory modules)—those small circuit boards with eight surface-mounted DIPs attached. But the A3000 uses ZIPs (zigzag inline package), which look like a DIP that mated with a pogo stick. The plastic package has all of the legs on one side, and they zig-zag slightly.

ZIPs are less common than DIPs, and SCRAM is less common than page mode RAM. The net result is that RAM for the A3000 is more expensive than for other machines. 256x4 SCRAM sells for around $10 and 1x4 SCRAM is generally over $60 per chip. Prices will come down over the next few months, but it's worth taking the time to shop around for the best deal.

IN OTHER NEWS...

AmiEXPO is coming to the Disneyland Hotel October 5-7 in Anaheim. This is the premier Amiga computer show, and usually well worth the trip. This year there will be over one hundred exhibitors as well as classes in Amiga graphics, video, multimedia, animation, rendering, and desktop publishing.

Public domain program of the month is Starburst, written by Willie Langeveld. It's a simple program, but it makes working on the Amiga under 2.0 much easier. The standard Amiga wildcard for a string of characters is "#?". This requires typing two keys while holding the Shift key down as well. It's a pain, and many people often forget which two keys are needed. Starburst lets you use the "*" instead. This is much easier, and has become somewhat of a standard for many. ■

By using chips that can be read four bits at a time, you can add memory in 8-chip increments. Such chips are known as "by fours,"(256x4 or 1x4).

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 continued from page 80

PRODUCT UPDATES

➤ **Santa Cruz Operation, Inc., (SCO)** is now shipping **SCI UNIX System V/386 Release 3.2 v2.0**. New features include enhanced I/O performance, as well as support for ISO "High Sierra" CD-ROM files, PostScript printers and enhanced memory. Contact: SCO, Inc., 400 Encinal St., PO Box 1990, Santa Cruz, CA 95061. (408)425-7222.

➤ **Shiva Corporation** is offering a trade-in program for those buying the **Fast Path v4** update. The FastPath gateway connects LocalTalk and Ethernet and supports multiple network protocols. For a limited time, owners can trade in FastPath v1, 2, or 3 or the Catman GatorBox and receive a FastPath v4 for only $999. Contact: Shiva Corp., 155 Second St., Cambridge, MA 02141. (617)864-8500.

➤ **SitBack Technologies, Inc.** is now shipping a major upgrade to **SitBack, v3.0**. SitBack is a memory resident backup utility that automatically performs total and incremental backup in the background on standalone PCs or whole networks. Contact: SitBack Technologies, Inc., 9290 Bond, Suite 210, Overland Park, KS 66214. (913)894-0808.

➤ **Tiara Computer Systems, Inc.** is offering an enhanced version of its **ARCnet PC** and **AT network adapter cards**. Other related adapter products, the ARCnet active hubs and 16-bit Ethernet coax adapter, have been reduced in price for ARCnet users. Contact: Tiara Computer Systems, Inc., 2700 Garcia Ave., Mountain View, CA 94043. (415)965-1700.

➤ **Ventura Software, Inc.**, a Xerox company, has announced an upgrade strategy for registered users of the **Ventura Publisher Gold Series**, DOS/GEM Edition. Under this new policy, customers who recently upgraded to the 3.0 GEM Edition will be able to purchase the Windows or OS/2 Editions for $195 until December 31, 1990. Registered users of Ventura Publisher 2.0 base product, 1.0 or 1.1 can upgrade to the GEM Edition for $160 or the Windows or OS/2 Editions for $195. Contact: Ventura Software, Inc., 15175 Innovation Dr., San Diego, CA 92128. (619)673-0172.

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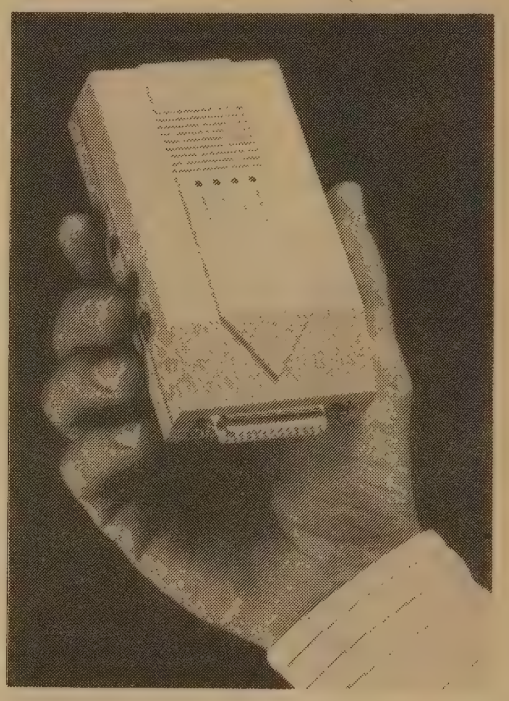

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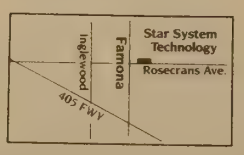

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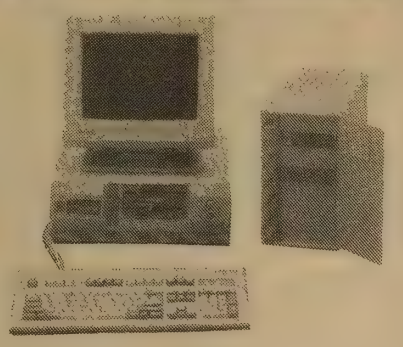

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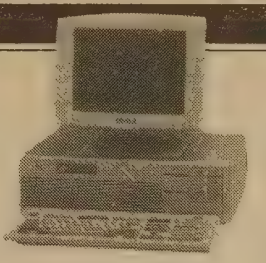

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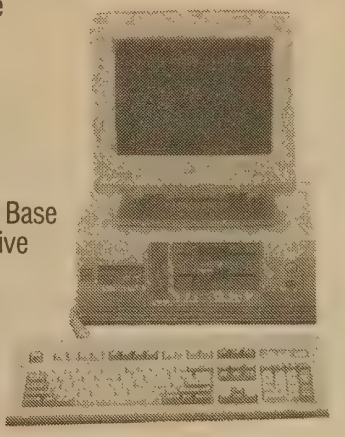

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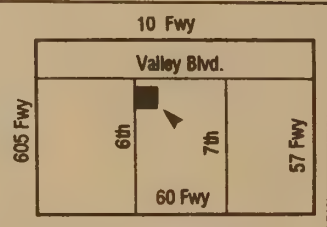

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US Robotics has introduced three new modems. The Courier HST Dual Standard, USR's top model, combines the company's proprietary 14,400 bps HST technology with CCITT's V.32 9600 bps transmission standard. Its successful data compression uses a higher-level algorithm than MNP5 compression, producing about 35 percent better results. The Courier HST and the Courier V.32 transmit at 14,000 and 9600 bps, respectively. US Robotics is offering free upgrades for modems purchased after October 1, 1989. There will be a $50 charge for

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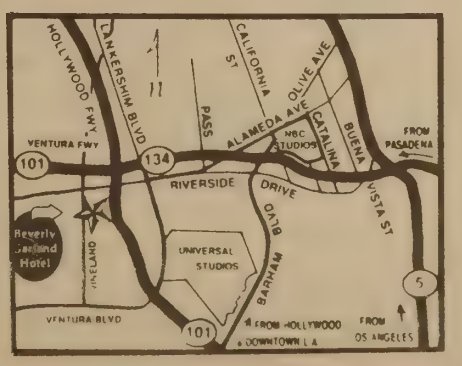

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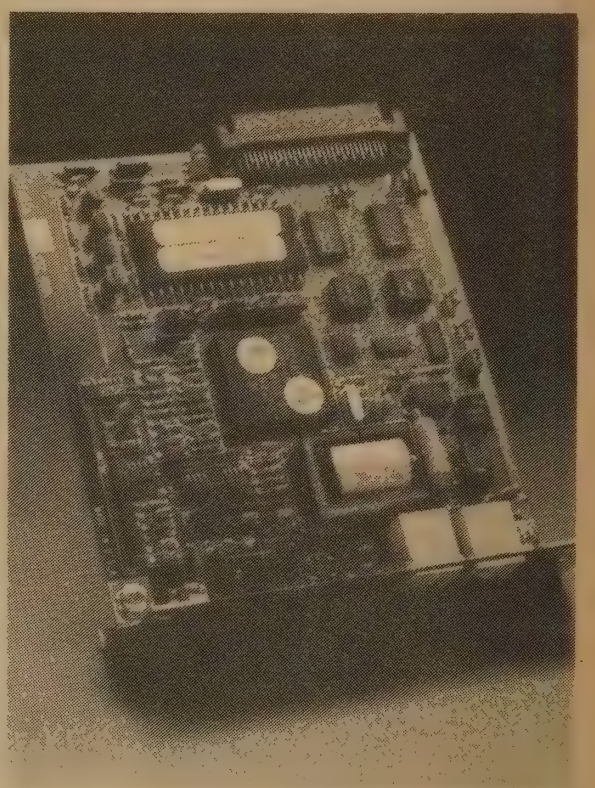
upgrading modems purchased prior to that. (The Courier HST Dual Standard lists for $1,595, the Courier HST for $995 and the Courier V.32 for $1,099) US Robotics, Inc., 8100 North McCormick Blvd., Skokie, IL 60076. 1-800-DIALUSR.

MEGAHERTZ MAKES FAX/MODEM FOR TOSHIBA LAPTOPS

Megahertz's Easy Talk Fax allows users to send, receive, view and edit fax transmissions on a Toshiba laptop. This 9600 bps FAX/modem also doubles as a



Hayes-compatible 2400 bps modem. The card comes with Easy Talk Fax software, which provides mouse support, on-line help menus, automatic generation of cover sheets and other assistance. Easy Talk Fax is covered by a five-year warranty that includes toll-free technical support. A modular phone cord and Procomm communications software are also included. ($599) Megahertz Corp., 4505 South Wasatch Blvd., Salt Lake City, UT 84124. (801)272-6000.

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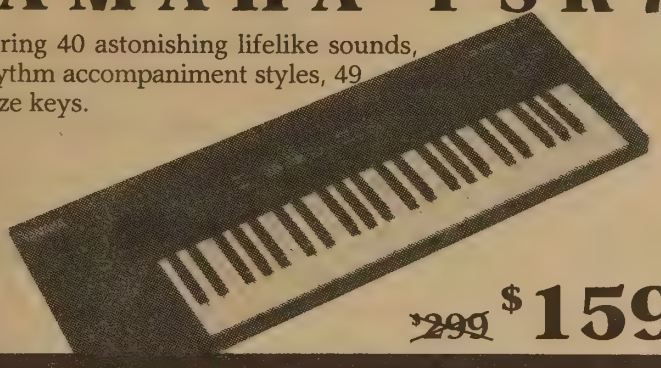

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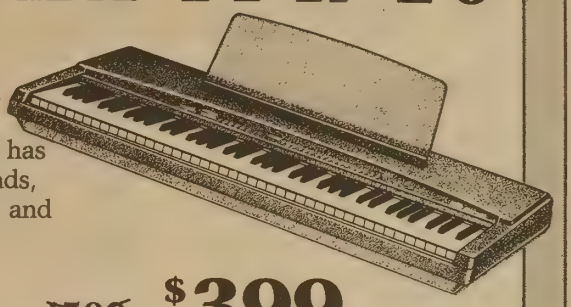

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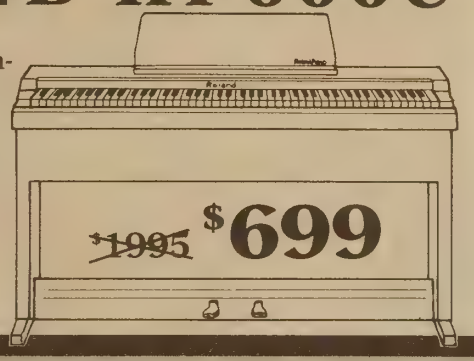

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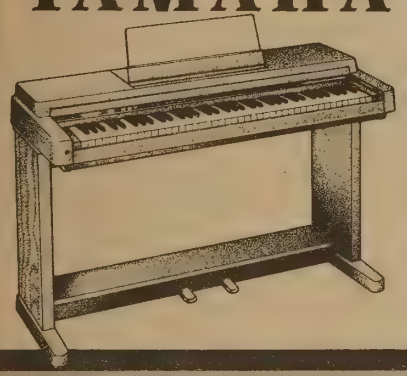

This very popular model features 76 keys and Yamaha's AWM technology for superb acoustic piano sounds. You'll have to hear it to believe it.

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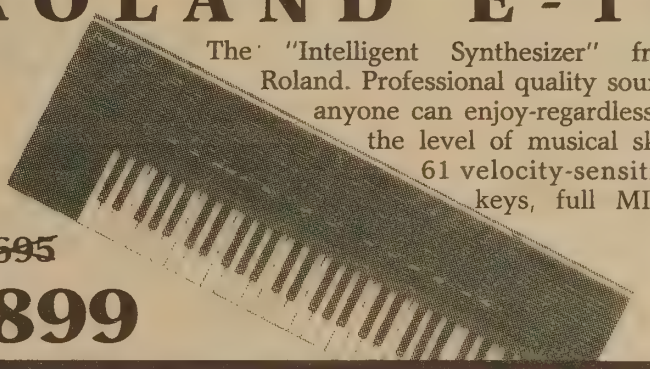

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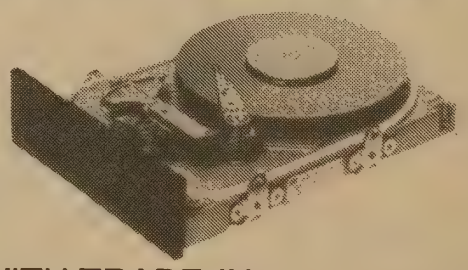

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enables the caller to request and receive documents 24 hours a day from anywhere in the country. The FaxMail database can be accessed through a voice menu, and then the caller can select the document he or she needs and wants to retrieve. FaxMail is fully automated and can operate unattended. ($7500) FaxQuest Corp., 330 Townsend St., San Francisco, CA 94107. (415) 541-4937.

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Computer Peripherals, Inc. (CPI) has developed Hook-UP 96/24, a half-card combining a 9600 bps fax with a 2400 bps internal modem. This card sends and receives fax messages, as well as doubles as a Hayes-compatible 2400 bps internal modem. It will automatically detect whether an incoming call is addressing the fax or the modem. The unit comes with both fax and modern communication software. When the modem operates in background mode, delayed transmissions are permitted, and bulletin board operations can be used. ($495) Computer Peripherals, Inc., 667 Rancho Conejo Blvd., Newbury Park, CA 91320. 1-800-854-7600.

GAME REVIEWS

By Mike Markowitz

Even those who never played with toy trains and never considered themselves "railroad buffs" may be glad to have a top-quality computer simulation that doesn't involve killing anything, or blowing anything up.

RAILROAD TYCOON

Designed By: Sid Meier
Published By: Microprose
For: IBM PC and compatibles
Requires: 512K (640K in VGA mode)
List Price: $54.95

Veteran board game players may remember a classic British import called "1830." It was a deep and beautiful simulation of the early days of railroad building in England. Now Microprose has brought the same experience to the small screen with Railroad Tycoon.

The game offers players a choice of four different "worlds": England in the 1820s, the Eastern United States in the 1830s, the Western United States in the 1880s, and Europe in the early 1900s.

The design successfully integrates many different activities and levels of play—financial wheeling and dealing, right-of-way planning and construction, the purchase and management of rolling stock, and the dispatching of individual trains.

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October 27, 1990 SATURDAY LA Fairgrounds (Fairplex) Pomona
November 10, 1990 SATURDAY Convention Center, Long Beach
November 11, 1990 SUNDAY Sequoia Conference Center, Buena Park
November 17, 1990 SATURDAY LA Fairgrounds (Fairplex), Pomona
November 18, 1990 SUNDAY Sherman Entertainment Center, Reseda

PRODUCT SPOTLIGHT

The beautifully colored game maps allow you to zoom from a continent-wide view, down to the details of a local region. Color is required, and a mouse is strongly recommended. There are delightful animated sequences when you build a bridge (and when one gets washed away). The game communicates information in many ways; for example, by flashing headlines from the "Railroad Times" or by presenting annual balance sheets.

Railroad Tycoon is lavishly documented, with a history-packed 180-page manual, a technical supplement and two laminated cards that diagram the intricate resources and economies of the game. A helpful tutorial smooths out the steep upgrade of the game's learning curve (I think I can, I think I can....).

Even those who never played with toy trains, and who never considered themselves "railroad buffs" may be glad to have a top-quality computer simulation that doesn't involve killing anything, or blowing anything up.

We're only halfway through 1990, but Railroad Tycoon is a shoo-in for a Game of the Year nomination. I can only hope that Microprose follows up with a Macintosh version, so that MS-DOS users won't have all the fun.

SOLITAIRE ROYALE

Published By: Spectrum Holobyte
For: Macintosh, Apple IIGS, IBM PC and compatibles
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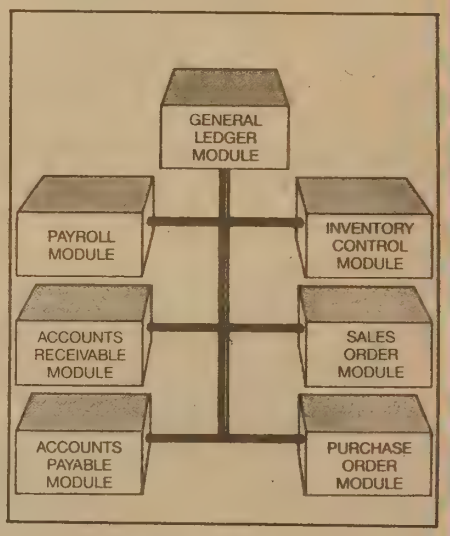

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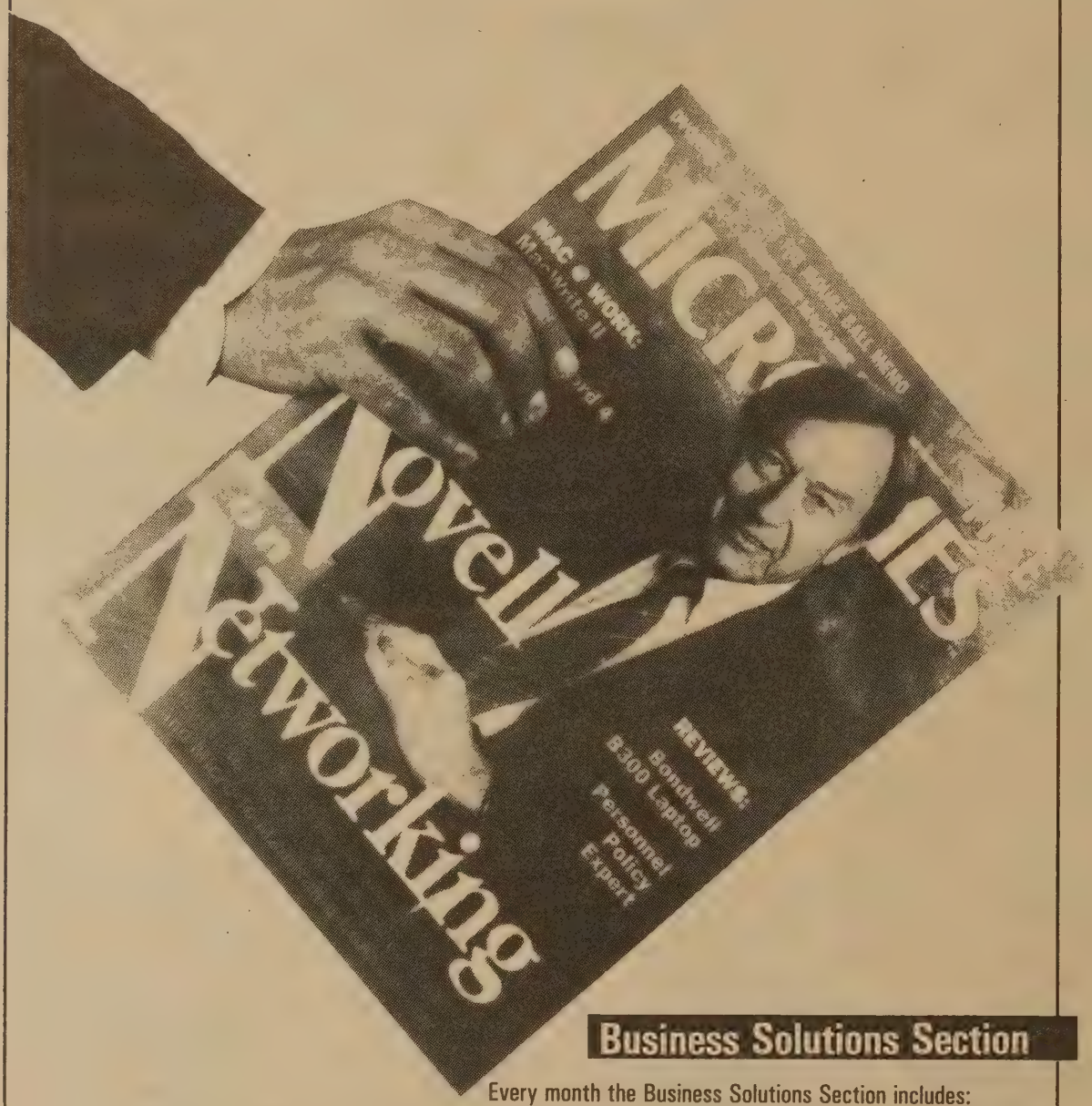

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is no exception. In fact, this is the most soothing computer game I've played since Shanghai—which is not surprising since the Mac version was done by the same brilliant programmer, Brodie Lockard.

The games are called Pyramid, Golf, Klondike, Canfield, Corners, Calculation, Three Shuffles and a Draw, and Reno. The one called Klondike here is the classic game of Solitaire, also known as Patience. Several of the variations are extremely difficult to win, but still fun to play. There are also three very simple children's games: Pairs, The Wish and Concentration.

The Apple IIGS version was programmed in 65816 assembly language, and includes excellent digitized sounds for the shuffle and snap of the cards. You can customize the background color, and select from a variety of different card deck designs. For the incurable competitor there is even a Tournament mode that lets you keep score while playing against an opponent (who receives exactly the same deal of the cards).

WOLFPACK

Designed By: NovaLogic, Inc.
Published By: Brøderbund
For: IBM PC and compatibles (512K; VGA, EGA, Tandy, CGA or Hercules video)
List Price: $54.95

This intricate and beautiful simulation of World War II submarine combat in the Atlantic will appeal to anyone who loved the film *Das Boot*. In 256-color VGA mode, the game is visually stunning, with somber graphics that use sophisticated anti-aliasing to boost the apparent screen resolution. The targets seen through your periscope are richly detailed, and they look and move like ships—not the crude polygons we've gotten used to in similar games.

The game's sound effects are compatible with the AdLib, SoundBlaster and Tandy stereo audio cards.

You can take the role of the submarine captain, or the skipper of a destroyer; a mission construction set lets you create your own scenarios, from any year of the war. The computer can take either side, or you can have two human players. You can also command an entire German Wolfpack, or Allied convoy, selecting individual ship captains based on their personalities and probable responses.

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are slightly simplified (in reality, computing the lead angle for a torpedo shot is very tricky, but in the game you just aim and fire). Battle damage is modeled very realistically, system by system. The game also allows the rather difficult mission of refueling and rearming a submarine at sea (the Germans used special resupply U-boats called "milk cows").

The 90-page manual is illustrated with historical photos and packed with technical information and tactical hints. The game uses an "off-disk" copy protection scheme that requires you to hunt down a particular word in the manual and enter it accurately in order to start play. An installer makes it easy to copy the program's two floppies onto your hard disk. I would not recommend Wolfpack for any player without at least an EGA video monitor (VGA preferred!).

STRIKE ACES

Designed By: Andy Craven, Ciaran Gultnieks, Ian Martin
Published By: Accolade
Requires: IBM PC or compatible (512K, 8MHz or faster recommended)
List Price: $49.95

Gimme a break. Not another low-fidelity combat flight simulator to cash in on the waning popularity of Top Gun and its tedious imitators....

Hold on there. At least this one has some good ideas.

Gimme a break. Not another low-fidelity combat flight simulator to cash in on the waning popularity of *Top Gun* and its tedious imitators....

Hold on there. At least this one has some good ideas. It's based on the annual international competition for the Curtis LeMay Trophy, a sort of Olympics of precision bombing and navigation held at Ellsworth Air Force Base in South Dakota. You can actually buzz Mt. Rushmore, and some missions require in-flight refueling (an incredibly difficult thing to simulate well—bravo to the design team!).

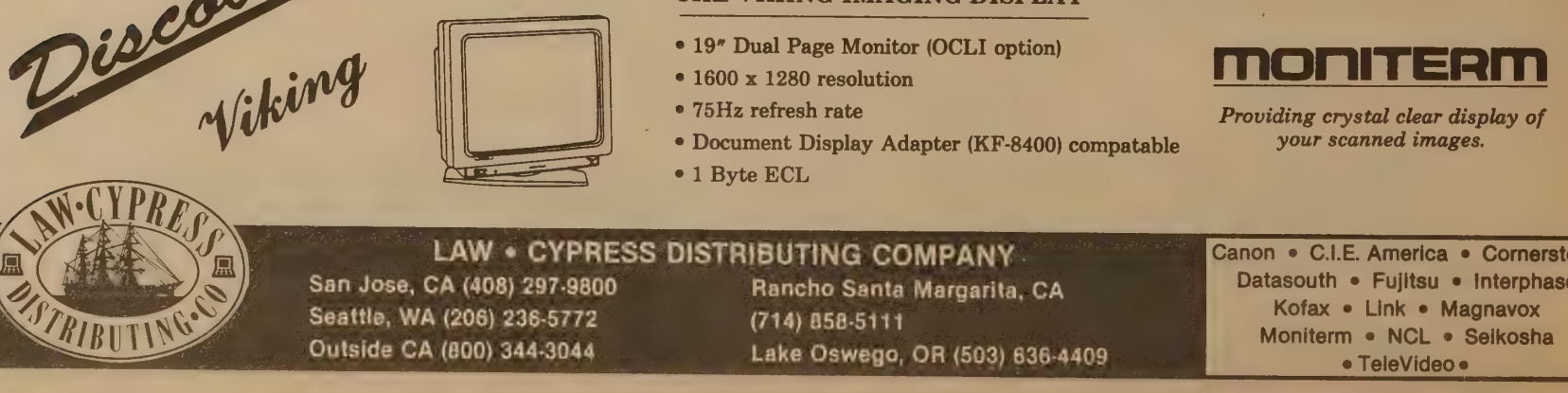
You choose one of six different strike aircraft: F-111F, Panavia Tornado, F-15E, F-4E, MiG-27 or Saab Viggen. You select your armament from an extensive menu of different bombs, missiles and rockets. You can also choose an opposing interceptor: F-14 Tomcat, F-16 Falcon, F-5E, MiG-29 Fulcrum, Mirage 2000, or SU-27 Flanker.

The game has a very well-designed installation program, with the video graphics drivers (CGA, EGA, VGA) on separate disks, so you only install the one you need. The copy protection is based on a code-wheel included in the package—it's loosely based on the authorization codes used to arm actual weapons.

The cockpit interiors are modeled as detailed bit-map graphics, and the view out of the canopy is modeled as a series of simple polygon fills. Keyboard and joystick input are supported, but I cannot imagine anyone enjoying any flight simulation with only the cursor keys for input.

The package modestly suggests a minimum CPU clock speed of 8MHz.

You can balance the speed of the game against the speed of the computer by selecting different levels of graphic detail during installation—this is a very smart feature that more PC game publishers should include in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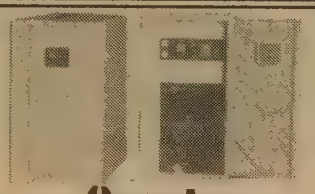

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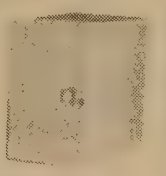

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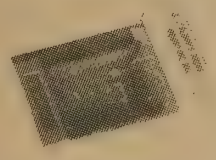

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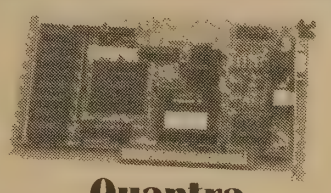

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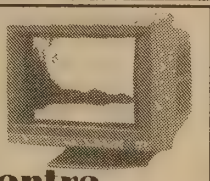

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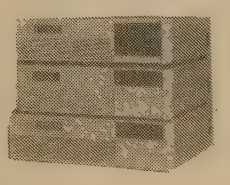

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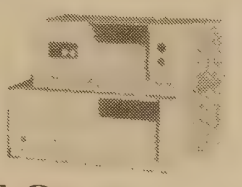

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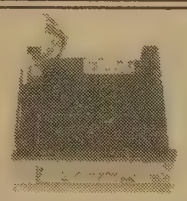

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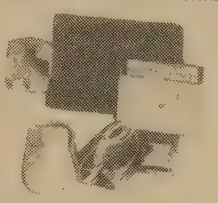

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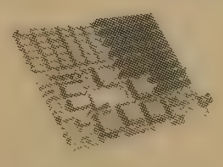

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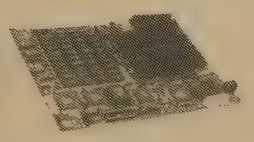

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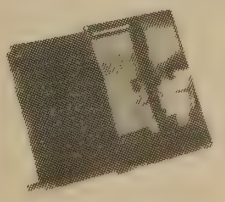

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Note: all the programs listed in this category require the MacPaint program, sold commercially.

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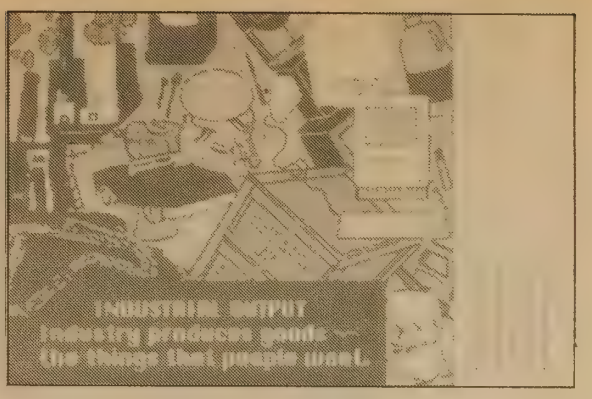

Balance of the Planet simulates the global ecosystem.

their designs.

The 64-page manual is required reading before you start playing. A quick reference card or keyboard template would have been helpful, but you can't expect everything in a modestly-priced simulation. An Amiga version should be shipping by the time you read this.

BALANCE OF THE PLANET

Designed By: Chris Crawford
Distributed By: Accolade
For: IBM PC (512K; CGA, EGA or VGA graphics) or Macintosh (1Mb); hard disk required for both versions
List Price: $49.95

Any new game by Chris Crawford (author of Balance of Power and other greats) is a major event in the world of desktop simulation.

Balance of the Planet is a simulation model of the global ecosystem and the world economy over the next fifty years. You take the imaginary role of UN High Commissioner for the Environment, an eco-czar with the power to tax various industries ("watch my lips, no Nuke taxes"). With your tax revenue you can subsidize various activities, like family planning or recycling centers, and invest in different research priorities (cleaner coal, solar energy, genetic engineering). The simulation includes 150 critical variables, and unlike many game designers, Crawford lets you see the equations that drive the model, and even tinker with them if you dare. Each "turn" represents a five-year plan, and most actions have immediate effects—a design compromise that trades realism for simplicity.

The game's graphics are strikingly different from the high-tech control panels and multicolor maps you might have expected. Amanda Goodenough (familiar to Mac users as the author of the Inigo stories and other HyperCard entertainments) created 150 screens that illustrate concepts in an informal, cartoon-like way. Crawford says he "wanted warm and cuddly artwork."

The game manual is a substantial 136-page softcover book. Along with clear explanations of how to play, there are thoughtful Designer's Notes, a "Quickie Math Refresher," a glossary, a bibliography and a discussion of "How accurate is the simulation?" Most of the manual consists of one-page essays on each of the major concepts or variables in the game.

Balance of the Planet is highly abstract and quantitative—the sort of game an accountant might love. For the first few turns, your score drops relentlessly, whatever you do, as starvation, pollution and the devastation of natural habitats work their evil way. As you learn to make the right choices, your score improves.

Since many of the environmental issues in the game are controversial, Crawford lets you create "bias" files that reflect your own values, opinions and judgments about the world. There are four ready-made bias files that you can load at the start of a game: Pro-Nuclear, Environmentalist, Industrialist and Third World.

The MS-DOS version, on three 5.25" floppies, has an elegant automated installer program. The Mac version is on two 800K disks. Both versions require a hard disk, take up about 1.5Mb of space, and share a common

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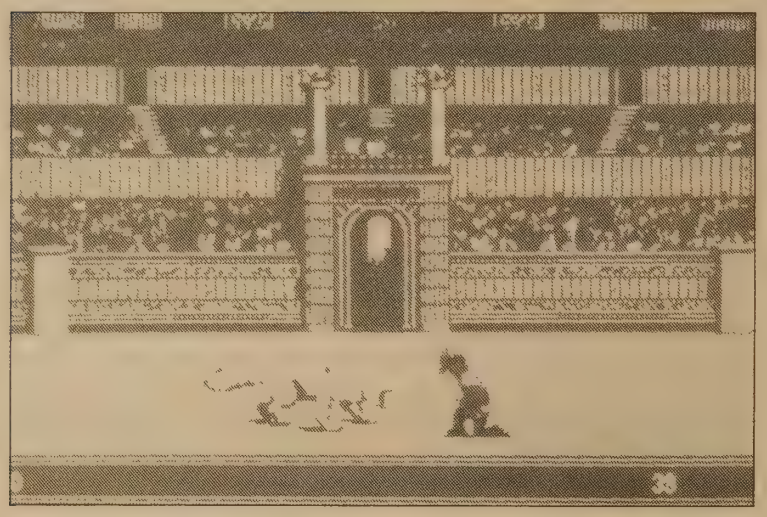
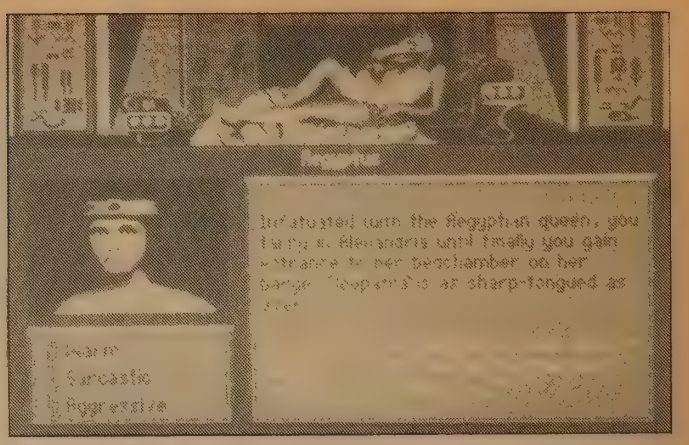
look and feel. Although Crawford shudders at the thought of his work being "consigned to some sort of kiddie-software-ghetto," I would highly recommend Balance of the Planet for the consideration of any computer-using educator who teaches economics, earth science, future studies, or environmental issues.

CENTURION: DEFENDER OF ROME

Designed By: Kellyn Beeck, Evan and Nicky Robinson
Published By: Electronic Arts



Centurion offers recreation as well as combat.



As a successful player, you may win the hand of Cleopatra.

For: IBM PC and compatibles (640K) EGA, Tandy 16-color, VGA or MCGA graphics required, Soundblaster and Roland MT-32 audio cards supported, hard disk and mouse recommended
List Price: $49.95

If you've ever identified with Kirk Douglas in *Spartacus*, Charlton Heston in *Ben Hur*, or John Cleese in *Life of Brian*, this is the game for you. Centurion combines enough Imperial splendor and glory to please a Hollywood mogul, with enough historical accuracy to please Miss Seligson, my unforgettable high school Latin teacher.

You start out in the time of the early Republic (c. 275 BC) as a young officer with one legion. As you move across the map into neighboring provinces, you can form alliances, or fight the barbarians. You have control over realistic battlefield tactics and formations. As you gain rank, you can build fleets and fight sea battles, stage chariot races in the Circus Maximus, or preside over gladiatorial combats in the Colosseum, with full animation and sound effects.

There are nine grades of rank, with increasing income and power, leading to the supreme title of Caesar. You gain rank by adding provinces to the Empire, winning chariot races, staging gladiator shows, and avoiding revolts. You can even emulate Richard Burton by winning the hand of the lovely Cleopatra. There are many ways to win, and plenty of options to keep the game interesting through multiple playings. The graphics deserve a VGA monitor or equivalent.

The 42-page manual is essential reading, and you'll need to keep the 12-page Command Summary close at hand to manage this complex game. A big, handsome fold-out map provides obscure geographic facts for the unobtrusive off-disk copy protection scheme. ■

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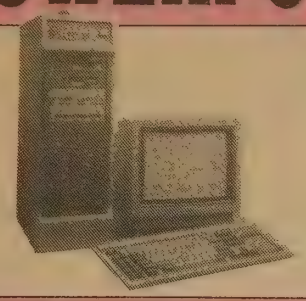

DR 386-33 CACHE SYSTEM

w/64 KB Cache.....$1400

- 1 MB RAM installed
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w/32 KB Cache $1200
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- AT Case and 230 W Power Supply
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DR 286-16 MHz.....255
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Oak Chip VGA Card, 800x600, 256KB. . .73
Genoa Super EGA, 800x600, 256KB. . . .75
Color Graphics Card, 640x200 25
Monochrome Graphics Card, 720x350. . .19

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D.S. 360KB, 5¼" Floppy Disk 55
ST 251-1, 40MB, 28ms Hard Disk.....295
NEC 3142, 42MB/65MB, 25ms Hard Disk.310
NEC 5655, 157MB, ESDI, 18ms Hard Disk 775
Conner 3044, 40MB, 25ms Hard Disk . .335
WD95044, 40MB, 28ms Hard Disk 250
Conner 3184, 80MB, 22ms HDD 525
Conner 3104 100MB 22ms Hard Disk. . .595
Conner 3204, 200MB, 19ms Hard Disk. .955

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GS 1425+ 14" VGA, 640x480 310
GS 1430 14" VGA, 640x480 340
Livescan 14" Multisync, 800x600.....345
1OCOMM Super VGA, 1024x768 365
Panasonic 1381, Super VGA, 1024x768, Noninterlace.....465
Qume QM 850 Multisync 1024x768 (NEC compatible) 495

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DTC 7287, XT RLL 90
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DTC 6280 AT ESDI 145
IDE AT Bus Card 25

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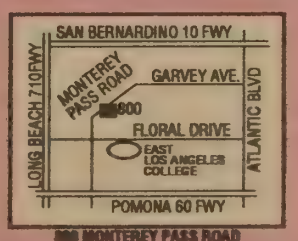

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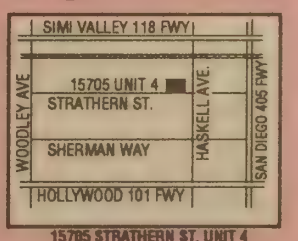

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RESOURCES

Calendar Of Events

SEPTEMBER

September 6–9 CyberArts International **Performances & Exposition.** Los Angeles. Miller, Freeman Expositions. Call: (415)995-2471.

September 8 Computer Swap. Orange County. Computer Swap. Call: 1-800-433-7469.

September 9 Computer Marketplace Show. Buena Park. Computer Marketplace. Call: 1-800-252-7927.

September 9 Computer Swap. Glendale. Computer Swap. Call: 1-800- 433-7469.

September 9 Computer Show & Sale. Ventura. East-West Computer Shows. Call: (415)388-8893.

September 9 The Burbank Computer Show & Sale. Burbank. East-West Computer Shows. Call: (415)388-8893.

September 9–12 The 1990 Ashton-Tate Technical Conference. Anaheim. Ashton-Tate. Call: 1-800-695-TATE.

September 10–13 The Fifth Annual NetWorld Expo. Dallas. H.A. Bruno, Inc. Call: Annie Z. Scully or Mark Haviland, 1-800-444-3976.

September 11–14 Software Quality Assurance & Testing Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

September 15 Computer Swap. CSUN. Computer Swap. Call: 1-800-433-7469.

September 15–18 First International Multimedia Conference. New York. MultiMedia Computing Corp. Call: 1-800-248-5474.

September 16 Computer Show & Sale. San Diego. East-West Computer Shows. Call: (415)388-8893.

September 17–19 Presentations '90—Graphics & Multimedia Conference And Exposition. Long Beach. Exposition Management, Inc. Call: 1-800-262-3378.

September 17–20 Software Testing Course. Los Angeles. UCLA. Call: (213)206-2815.

September 18–21 Intro To Telecommunications Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

September 20 Trainer's Association Of Southern California Meeting. Orange County. Trainer's Association. Call: Kitty LeSage, (714)540-6440.

September 22 Computer Marketplace Show. Long Beach. Computer Marketplace. Call: 1-800-252-7927.

September 22 Computer Swap. Anaheim. Computer Swap. Call: 1-800-433-7469.

September 23 Computer Show & Sale. Lancaster. East-West Computer Shows. Call: (415)388-8893.

September 23–28 Oracle 1990 International Users Week Conference. Anaheim. Oracle Corporation. Call: 1-800-441-4684 ext. 61.

September 25–27 The Fifth Annual PC Expo. Chicago. H.A. Bruno, Inc. Call: Annie Z. Scully or Mark Haviland, 1-800-444-3976.

September 25–28 Hands-on PC Configuration and Troubleshooting Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

September 25–28 Intro. To Datacomm And Networks Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

September 25–28 Hands-on Datacomm Troubleshooting Course. San Diego. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

September 29 Computer Market Show. Santa Barbara. Computer Attractions. Call: (818)994-7386.

September 29 Computer Marketplace Show. San Diego. Computer Marketplace. Call: 1-800-252-7927.

September 30–October 2 The 1990 Ventura Publisher Seminar. San Jose. Ventura Publisher User Group. Call: Bob Moody, (408)227-5030.

OCTOBER

October 1–5 CD-ROM Expo. Boston. World Expo Corp. Call: 1-800-225-4698.

October 2–5 Hands-on Datacomm And Networks Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

October 2–5 The X Window System: Fundamentals And Applications Development Class. Los Angeles. UCLA Extension. Call: (213)825-1047.

October 4–12 Efficiency Beurs: International Trade Fair. Amsterdam. RAI Gebouw.

continued

SEPTEMBER 6–9, 1990

CYBERARTS INTERNATIONAL PERFORMANCES & EXPOSITION

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8087-3 84
80287-G 129
80287-8 189
80287-10 249
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Sony
1304 ..... Call

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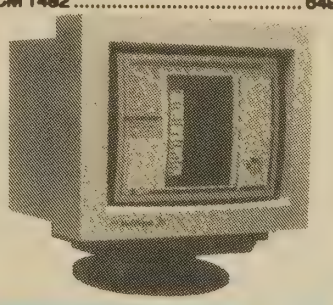

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Calendar Of Events *continued*

Call: 020-549-12-12.

October 6 Computer Marketplace Show. Pomona. Computer Marketplace. Call: 1-800-252-7927.

October 7 Computer Marketplace Show. Reseda. Computer Marketplace. Call: 1-800-252-7927.

October 7 Computer Show & Sale. San Diego. East-West Computer Shows. Call: (415)388-8893.

October 9–11 4th Annual Engineering Workstations Conference. Los Angeles. National Institute For Management Research. Call: (213)450-0500.

October 10–12 Imaging '90 Conference And Exposition. New York. BIS CAP International. Call: (617)982-9500.

October 10–12 Seventeenth International Information Management Expo & Conference. New York. Cahners Exposition Group. Call: Marilyn Harrington, (203)352-8477.

October 13 Computer Show & Sale. Ventura. East-West Computer Shows. Call: (415)388-8893.

October 13 Computer Swap. CSUN. Computer Swap. Call: 1-800-433-7469.

October 14 Computer Marketplace Show. Buena Park. Computer Marketplace. Call: 1-800-252-7927.

October 15–19 Neural Networks: Translating Theory To Real World Applications Class. Los Angeles. UCLA Extension. Call: (213)825-1047.

October 16–19 Hands-on UNIX Systems And Applications Programming In C Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

October 18 Trainer's Association Of Southern California Meeting. Orange County. Trainer's Association. Call: Kitty LeSage, (714)540-6440.

October 20 Computer Swap. Anaheim. Computer Swap. Call: 1-800-433-7469.

October 22–24 Electronic Messaging '90: Beyond Interpersonal Correspondence Conference. San Francisco. Electronic Mail Association. Call: (703)522-7111.

October 27 Computer Marketplace Show. Pomona. Computer Marketplace. Call: 1-800-252-7927.

October 29–November 1 Applying Total Quality Management To Software Systems Class. Los Angeles. UCLA Extension. Call: (213)825-1047.

October 30–November 2 Hands-on PC Configuration & Troubleshooting Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

October 30–November 2 Software Requirements & Design Specifications Course. San Diego. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

October 31–November 2 UNIX Expo. New York. National Expositions Company. Call: Heidi Dethloff, (3[redacted]

NOVEMBER

November 1–December 13 The Digital Musician: Tools For Making Music In The MIDI Era Course. Los Angeles. UCLA Extension. Call: (213)825-9064.

November 5–December 10 MIDI Sequencing Course. Los Angeles. UCLA Extension. Call: (213)825-9064.

November 6–9 Software Quality Assurance & Testing Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

November 6–December 11 The Cutting Edge—The Latest Technologies For Electronic Music Course. Los Angeles. UCLA Extension. Call: (213)825-9064.

November 7–December 12 Computers For Musicians: A Hardware And Software Overview Course. Los Angeles. UCLA Extension. Call: (213)825-9064.

November 10 Computer Marketplace Show. Long Beach. Computer Marketplace. Call: 1-800-252-7927.

November 11 Computer Marketplace Show. Buena Park. Computer Marketplace. Call: 1-800-252-7927.

November 12–16 The 4.3BSD UNIX Kernel Class. Los Angeles. UCLA Extension. Call: (213)825-1047.

November 15 Trainer's Association Of Southern California Meeting. Orange County. Trainer's Association. Call: Kitty LeSage, (714)540-6440.

November 17 Computer Marketplace Show. Pomona. Computer Marketplace. Call: 1-800-252-7927.

November 18 Computer Marketplace Show. Reseda. Computer Marketplace. Call: 1-800-252-7927.

November 27–30 Hands-on UNIX Systems And Applications Programming In C Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

SEPTEMBER 17–19, 1990

PRESENTATIONS '90: GRAPHICS & MULTIMEDIA CONFERENCE & EXPOSITION

Long Beach

Presentations '90 brings together all of the major forces in the presentations marketplace. Major topics at the conference include: Presentation Management and Implementation, Graphics Design and Delivery, and Multimedia Hardware for Presentations. Keynote addresses will be presented by Peter Clarke, Dean of the Annenberg School for Communication, USC and Lucie J. Fjeldstad, Vice President, IBM. Contact: Exposition Management, Inc., 1601 Trample Rd., Waltham, MA 02154. 1-800-262-3378.

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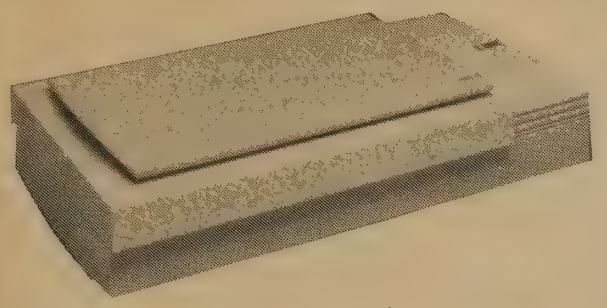

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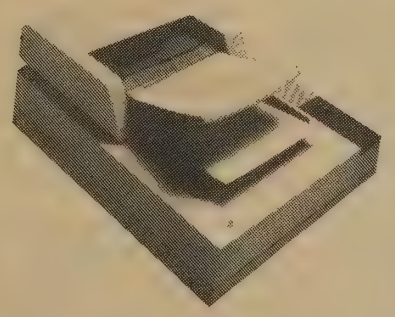

AVR 302 100 Page High Performance OCR System
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Scanner Product Comparison

Mfg. / Model	Scan Time	Software	Scan Area	List Price
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HP Scanjet Plus	12 Sec.	Scan Gallery	8.5x11"	$2195
Microtek MSF300G	8 Sec.	Astral PP	11x14"	$2195
Microtek MSF300Z	100 Sec.	Astral PP+	11x14"	$2695

Grey Scale Printer Controller Comparison

Mfg. / Model	256 Grey Scale	Resolution	List Price
Tall Tree JLASER 5	Yes	1000DPI	$495
Intel Visual Edge	64 Grey Scale	300DPI	$695
Laser Master LX-6	Yes	800DPI	$2995

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USER GROUP NETWORK

BULLETIN BOARDS

213

Amiga Exchange BBS. (213)325-1796. 24 hrs., 9600. 50 megs. Sysop: Robert Takahashi. [Exp. #74.]

Best & Worst #1. (213)864-2105. C64 & C128 specific. [Exp. #75.]

Best & Worst #2. (213)927-5016. C64 & C128 specific. [Exp. #75.]

Drug Abuse Information (DIAMP). (213)825-3736. 8-N-1, 24 hrs., 300/1200/2400. Drug information, statistics, bibliographies, forums, e-mail, downloads, and uploads. Free membership, reg. requested. Sysop: Greg Cason. [Exp. #75.]

KBBS Los Angeles. (213)558-0145. 8-N-1, 300/1200/2400/9600. Free group chat, 32 lines, 700Mb, 12,000 calls per week. Sysop: Dale Dude. [Exp. #75.]

Kenny's Computer Club BBS. (213)432-0039. 8-N-1, 300/1200/2400. Word processing, database, and spreadsheets. Sysop: Kenneth Fonseca. [Exp. #73.]

LA Online. (213)372-4050. 8-N-1, 300/1200/2400. LA's largest online service. Local news, entertainment, info, thousands of classifieds. Free. [Exp. #76.]

LAAUGLine. (213)387-1002. 24 hrs., 300/1200/2400. Sysop: Tom Irwin. [Exp. #73.]

LAMG (Los Angeles Macintosh Group). (213)559-MACS. 8-N-1, 24 hrs., 300/1200/2400/9600. 100 megs online of Mac Rumors, news reviews, unclassified ads, discussions, observations, testimonials, and public domain software. Sysop: Reed Hutchinson. [Exp. #73.]

Miracle Programmer's Oasis. (213)730-0602. 8-N-1, 24 hrs., 300/1200/2400. Structured to teach all programming languages. Sysop: Louis. [Exp. #73.]

Mt. Hollywood BBS ICN. (213)666-6937. 8-N-1, 24 hrs., 300/1200/2400/9600. Email, up/down load, echo message areas, AA-BBS. Sysop: John Jansen. [Exp. #73.]

Offworld. (213)651-5588. 24 hrs., 300–38400. VSR/HST/MNP/v.32 an electric sanctuary for social revolution. [Exp. #75.]

OS/2 BLUEzz. (213)494-6168. 8-N-1, 24 hrs., OS/2 only (i.e., no "D-word" support). Sysop: John Krogh. [Exp. #73.]

The Information Station. (213)941-6128. 24 hrs., 1200/2400. IBM and compatibles. [Exp. #75.]

The Lord's Board. (213)782-6836. 8–N–1, 24 hrs., 300/1200/2400. Public domain and shareware programs, complete KJV Bible, Christian games, IBM Utilities online calendar of events. Sysop: Paul & Agena Aziz. [Exp. #74.]

the orginal off off broadway bbs. (213)453-7038. 8-N-1, 24 hrs., 300/1200. Non-subscription, text files, messages only. [Exp. #74.]

619

DataByte Computer Services. (619)367-9208. 24 hrs., Wildcat, Tomcat, USR-HST, Free, DPT Graphics. Sysop: Jim Kornegay. [Exp. #76.]

Satsang BBS. (619)364-0033. 8-N-1, 24 hrs., 300/1200/2400. 170Mb online, Wildcat, IBM files and programs, religion and metaphysics. Sysop: Ed Shimko. [Exp. #75.]

The Stumps BBS. (619)367-3420. 8-N-1, 24 hrs., 300/1200/2400/9600. SVGS & VGA Graphics, util., games and more! IBM & compatibles. Sysop: Mike Brown. [Exp. #73.]

714

Astro Atari BBS. (714)554-4658. 24 hrs., 300/1200/2400. Atari ST & 8 bit, 120Mb, pictures, games, utilities, DTP, Programming SIGs. [Exp. #73.]

Blue Mango Cafe. (714)449-9280. 24 hrs., 2400. Support all, spec. Atari. Putting communication back into telecommunication. Sysop: Captain Spock. [Exp. #73.]

Career–Link. (714)952-1431. 24 hrs., 300/1200/2400. Resume circulation, job listings, PD software downloads, msg. bases. [Exp. #75.]

Cash Cow BBS (N. Orange County Computer Club). (714)962-1857. 24 hrs., 2400. 4th year of operation, specialize in business, Lotus, applications. Sysop: Vance L. Jochim. [Exp. #76.]

Happy Trails BBS. (714)547-0719. 2400/9600. MS-DOS only, multiuser, multi-line, CD-ROM drive, SIG groups. Sysop: Don Inglehart. [Exp. #76.]

MicroCom BBS. (714)639-7725. 24 hrs., 300/1200/2400. Multi-line, multiuser games, email, SIGs, online shopping, dating. [Exp. #73.]

National Internal Audit BBS (NIABBS). (714)962-1857. 24 hrs., 2400. Forum for professional internal auditors. Audit checklists, tips, etc. 4th year. Sysop: Vance L. Jochim. [Exp. #75.]

South Bay Commodore User Group BBS. (714)858-2868. 300/1200/2400. [Exp. #74.]

System III. (714)830-1884. 8-N-1, 24 hrs., 1200/2400/9600. 300+ megs, national mail, online doors. For IBM and compatibles, distribution site for Mycroft Doorware. Sysop: Dave Safley. [Exp. #74.]

The Desktop BBS. (714)491-1003, 898-7269. 8-N-1, 24 hrs., 2400. Mac discussion, UL/DL, 2 lines. Sysop: Mark Murphy. [Exp. #73.]

The Flight Deck BBS (714)979-8444. 24 hrs., 1200/2400. Online games and movies, text files and messages. Sysop: A.W.K. [Exp. #73.]

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805

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Y–NOT? Annex. (805)985-5699. 8-N-1, 24 hrs., 1200/2400. Games and messages. Sysop: Terry Lee. [Exp. #74.]

818

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AEC-Online. (818)360-7022. 8-N-1, 24 hrs., Professional AutoCAD users forum, messages, ACAD specific files, chat, online ACAD help. Sysop: Lorne H. Steiner. [Exp. #74.]

Americom. (818)967-3108. 10:00pm–8:00am, 300/1200/2400. Multi-topic, special interest in HAM/SWL and scanners, home video/audio and medicine. [Exp. #73.]

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Color America, Inc. (818)963-3537. 8-N-1, 24 hrs., 300/1200/2400. Message board and shareware. Sysop: Dick Hagene. [Exp. #73.]

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Hard Ball PCBoard. (818)718-0610. 8-N-1, 24 hrs., 1200/2400. Large filebase, PC-SIG disk library online, downloadable message board, online doors and games. Sysop: The Umpire. [Exp. #74.]

KBBS Los Angeles. (818)886-0872. 8-N-1, 300/1200/2400/9600. Free group chat, 32 lines, 700Mb, 12,000 calls per week. Sysop: Dale Dude. [Exp. #75.]

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Tin Shack BBS. (818)992-3321. 24 hrs., 1200. The BBS for college students, faculty and new users. Sysop: Guy Nohrenberg. [Exp. #74.]

Tri-City Apple BBS. (818)288-6540. 8-N-1, 24 hrs., 300/1200/2400. Primarily Apple II, but others welcome. Email, PD, UL/DL, games. Sysop: Kris Holtzclaw. [Exp. #76.]

Valley Apple BBS. (818)782-6471. 24 hrs., 300/1200/2400. UL/DL, public domain, games. Sysop: Maurice Bernstein. [Exp. #73.]

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ACCPAC & Open Systems Users Group. Meetings: 1st Tues., 7:00 pm, Irvine. Call: Bob Jaffer, (714)962-4760. Speakers and demos. [Exp. #73.]

AMIGA

LAAUG—Los Angeles Amiga Users Group. Meetings: 3rd Wed., 7:30 pm, Veteran's Memorial Auditorium, Overland Ave. & Culver Blvd. Many SIGs, Rookies, DTP, Video, Monthly PD disks. Call: Kip Hammond, (213)390-3010. [Exp. #76.]

South Orange Commodore Klub. Meetings: 3rd Sat., 9:00 am, Union Federal, 23688 El Toro Rd., El Toro. All Commodore and Amiga users. Call: Don, (714)830-2430. [Exp. #77.]

ATARI

Atari Computer Association Of Orange County. Meetings: 2nd Sun., 12:30 pm, Tustin Senior Citizen's Center. Call: Rick, (714)996-8509. [Exp. #75.]

NOCCC Atari SIG. Meetings: 1st Sun., Chapman College, Wilkinson Hall, rm. 221. (714)633-4665 or 552-5185. [Exp. #75.]

APPLE

Tri-City Apple User Group. Meetings: 3rd Thurs., 7:00 pm, Pasadena Central Library Aud., 285 E. Walnut St. Friendly Apple II experts, SIGs, info exchange, PD library, raffle, newsletter. Call: (213)258-0281. [Exp. #79.]

Valley Apple Computer Club. Meetings: 3rd Tues., 7:30 pm, Union Federal Savings and Loan, 7040 Sepulveda Blvd. Call: Dr. William H. Trent, (818)988-1752. [Exp. #75.]

CAD/CAM

Los Angeles Area AutoCAD User Group. Meetings: 4th Thurs., except Nov. & Dec., which is 3rd Thurs., 6:30 pm, Burbank Library, 110 Glenoaks Bl. Meetings feature tutorials, Q & A's, demos and newsletter. Call: M. Berman. (818)762-9966. [Exp. #78.]

COBOL

Micro Focus COBOL & Macola Developer/User Group. Meetings: 2nd Thurs., 7:00 pm, Torrance. Speakers, demos, tips and techniques. Call: Wilson Mar, (213)539-3050. [Exp. #76.]

COMMODORE

C128 West Commodore 128 User Group. Meetings in Covina and Santa Monica. Free membership, no dues. Call: (818)331-1589 or 892-3859. [Exp. #76.]

Commodore Technical Users Group Of Orange County—CTUG Of Orange County. Meetings: 4th Sun., 11:00 am, Murcery Savings And Loan, 1095 Irvine Blvd., Tustin. Call: Lou Palush, (714)532-1802. [Exp. #75.]

South Bay Commodore User Group. Meetings: 3rd Thurs., 7:00 pm, Mercury Savings and Loan, 22939 Hawthorne Blvd., Torrance. Call: (213)324-8357, or BBS (213)545-8653. [Exp. #77.]

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USER GROUPS

DATAFLEX

DataFlex Professionals Guild. Meetings: 1st Sat., 8:30 am, Cinesound, 915 N. Highland, Hollywood. Call: Robert Ward, (213)382-4420. [Exp. #75.]

DBASE

The dBASE Language Professional Developers Group—DLaP. Meetings: 3rd Wed., 7:30 pm, Community Room of the Westside Pavilion. Call: Therese Padilla, (213)450-4399. [Exp. #75.]

UCLA PCUG dBASE SIG. Meetings: 3rd Wed., 7:30 pm, UCLA, Franz Hall rm. 1571. Call: Tom Rombouts (213)538-7108. [Exp. #75.]

Valley West dBASE Users Group. Meetings: 3rd Mon., 7:00 pm, Blue Cross of CA, 21555 Oxnard St., Woodland Hills. (818)988-6337. [Exp. #75.]

DESKTOP PUBLISHING

Southern California Ventrua Publisher User Group. Meetings: last Wed., 7:00 pm. (818)955-5830. [Exp. #75.]

Southern California Ventura Publisher User Group. (SC–VPUG). Meetings: 4th Thurs., 7:15 pm. Product demos, Q & A's, library resources. Call: (818)955-5830. [Exp. #78.]

EPSON

Epson User Group of Orange County. Meetings: 3rd Sat., 10:00 am, Westerm Federal Savings & Loan. Call, Bill Lafitte (714)548-1741 or 974-5072. Support, parts, library—QX, PX, Equity, VALDOCS, CP/M, MS-DOS. [Exp. #74]

San Fernando Valley & Los Angeles Epson QX User Group. Meetings: 3rd Mon., 7:30 pm. Supports QX-10, QX-16, PX-8, Valdocs, CM/P. Call: Dave Goldman, (818)717-1768 or 341-7632. [Exp. #76.]

IBM & COMPATIBLES

Channel Island PC Users Group. Meetings: 2nd Sat., 9:30 am, Camarillo Community Center, 1605 Burley St. Meetings feature help sessions, speakers on hardware, software, shareware, library, SIGs newsletter. Call: Bob, (805)983-4741. [Exp. #77.]

Color America, Inc., MS-DOS SIG. Meetings: 3rd Thurs., 7:30 pm, Charter Oak High School, 1430 E. Covina Blvd., Rm. B7, Charter Oak. Call: Bob Marvin, (714)861-2949. [Exp. #76.]

Greater South Bay Users Group. Meetings: 2nd Wed., 7:30 pm, Fellowship Hall, rear of Christ The Lutheran Church, 2706 W. 182nd St., Torrance. SIGs, BBS, newsletter, library and more. Call: Pamela Harrison, (213)373-4465. [Exp. #76.]

Long Beach IBM PC And Compatibles User Group. Meetings: 3rd Wed., 7:00 pm, Los Altos Methodist Church, 5950 E. Willow St/Woodruff Ave., Long Beach. Call: Jim Wells, (213)439-7114. [Exp. #76.]

North Orange County Computer Club (NOCCC). Meetings: 1st Sun., Chapman College. Thirty SIGs, including three on IBM, database, word processing, AI, investors, Lotus, OS/2 and graphics. Call: (714)998-8080. [Exp. #75.]

Orange Coast IBM-PC User Group. Meetings: Last Sat., 9:00 am, Orange Coast College, Costa Mesa. Call: Robin Clark, (714)843-2048. [Exp. #76.]

Orange County IBM-PC Users Group. Meetings: 2nd Tues., 7:00 pm, Computer Learning Center, 1240 S. State College Blvd., Anaheim. Call: Mike Lyons, (714)774-3236. Meetings feature guest speakers, sharing tips and problems, access to club library and newsletter. [Exp. #76.]

Pasadena IBM Users Group. Meetings: 3rd Wed., 6:30 pm, Caltech, Bridge bldg., rm 201. Call: Steve Bass, (818)795-3200. 3 hr. meetings have speakers on hardware and software topics including "tips and tricks," "stump the stars" and vendor demonstrations. Includes group library, newsletter, SIGs and BBS. [Exp. #76.]

South Orange County Computer Club (SOCCC). (714)554-1709. [Exp. #75.]

SWPC User Group. Meetings: 3rd Sat., mornings, various places. Call: Christine Tripp, (213)935-4105. [Exp. #76.]

System Users Network. Meetings: 4th Sun., 4–6 pm, Gardena YMCA, 1700 Redondo Beach Blvd. Call: Victor, (213)719–8659 or Burrell, (714)891-8843. [Exp. #77.]

Valley Computer Club. Meetings: 1st Wed., 7:00 pm, Burbank Board of Realtors Bldg., 2006 W. Magnolia. Guest speakers, info sharing, software library, newsletter, BBS. Call: (818)842-3707 or (213)221-4433. [Exp. #78.]

KAYPRO

KAYOS Kapro User Group. Meetings: Last Mon. of even months, 6:30 pm, El Segundo. Call: Margot, (213)379-8339. [Exp. #76.]

The Lakewood/Long Beach KUG (Kaypro Computers). Meetings: 2nd Wed., 7:30 pm, Mid Cities Bank, 9025 E. Artesia, Bellflower. Call: Mark Motley, (213)928-9096. [Exp. #76.]

West Los Angeles Kapro User Group. Meetings: 3rd Tues. of odd months, 6:30 pm, Mar Vista. Call: Barry, (213)390-3851. [Exp. #76.]

K-MAN

Southern California K-Man User Group. Meetings: 2nd Wed., 7:00 pm, Laventhol & Horwath, 3699 Wilshire Blvd, 7th fl., Los Angeles. Call: (213)739-6494. [Exp. #78.]

LOTUS & BUSINESS

Lotus and Business SIG. Meetings: 1st Sun. (verify at (714)998-8080), 11:15 am, Chapman College, City of Orange, Hashinger Hall. Call: Vance Jochim, (714)962-2517. SIG of 1200-member N. Orange County Computer Club. [Exp. #79.]

MACINTOSH

Pomona Valley 99ers. Meetings: 2nd Mon., 7:00 pm, First Federal, 9900 Central Ave. Call: Bill Harms, (714)628-1334. [Exp. #74.]

San Gabriel Valley Mac Users Group. Meetings: 1st Thurs., 7:30 pm, 285 E. Walnut, Pasadena Central Library Auditorium. Call: Char Rice, (213)684-4266. [Exp. #76.]

SBAMUG—South Bay Apple Mac User Group. Meetings: last Wed., 7:30 pm, Pacific School, 1214 Pacific Ave., Manhattan Beach. (213)316-7738. [Exp. #75.]

Whittier Area Mac Users Group. Meetings: 2nd Sat., 10:00 am, 11818 S. La Mirada Blvd., Granada Heights, Friends Church, rm C-21. Call: Char Rice, (213)947-2447. [Exp. #76.]

TEXAS INSTRUMENTS

Texas Instruments Professional Computer Users Group. Meetings: 4th Thurs., 55 Temescal Ter., San Francisco. Call: Thor, (415)386-5237 or Steve, (415)968-9543. [Exp. #75.]

THEOS

THEOS User Group. Meetings: Call: Fred Bellemy, (805)965-0265. [Exp. #76.]

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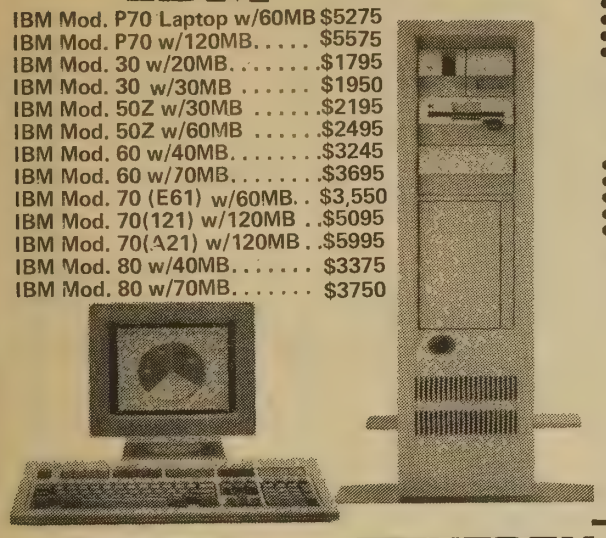

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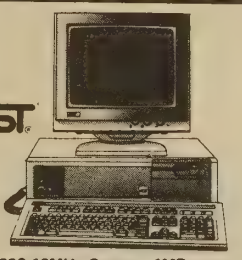

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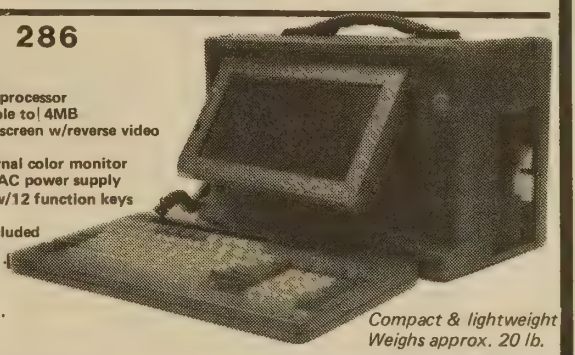

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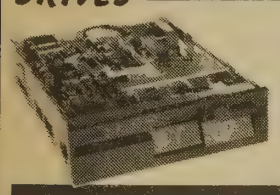

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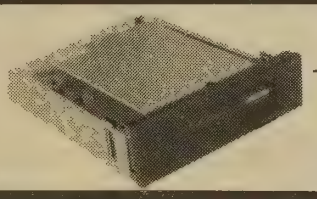

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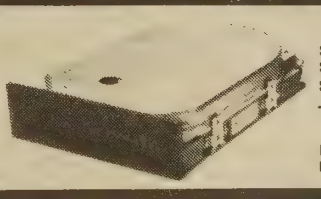

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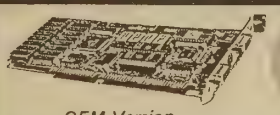

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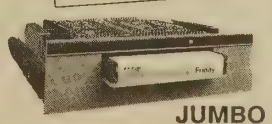

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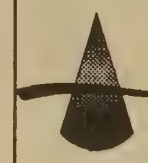

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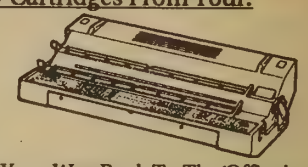

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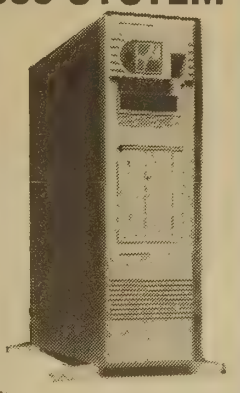

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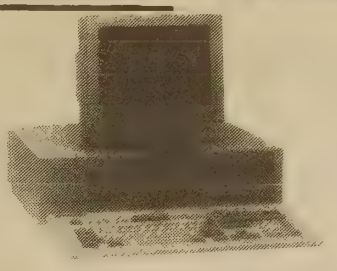

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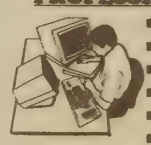

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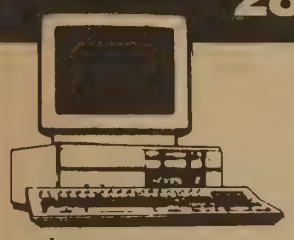

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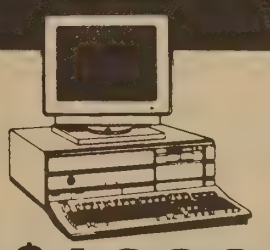

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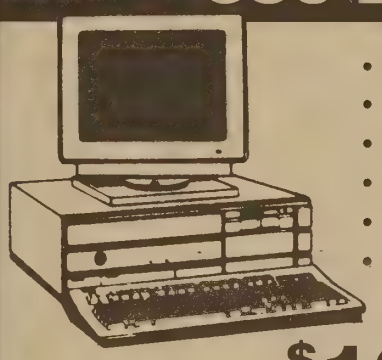

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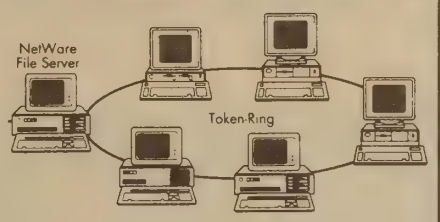

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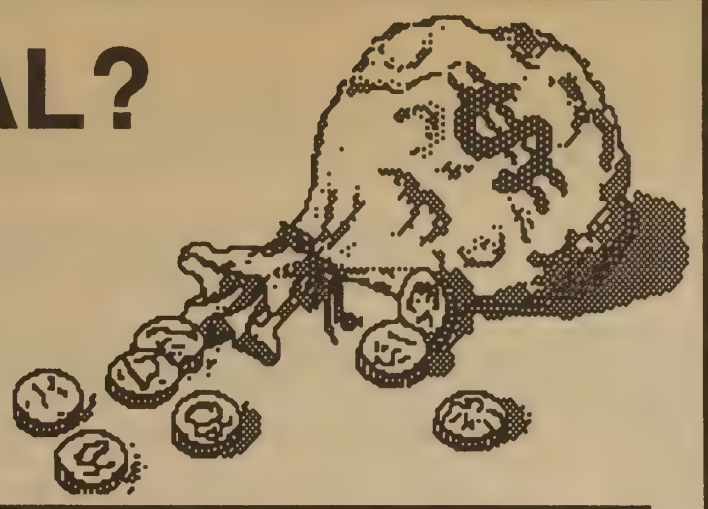

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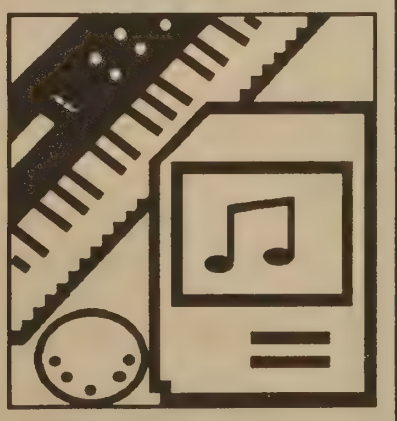

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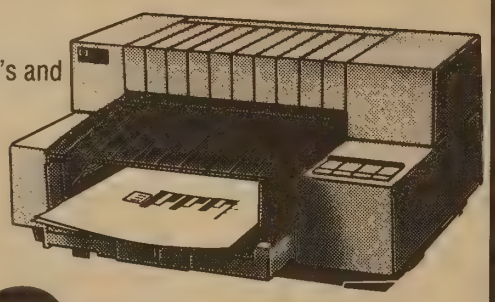

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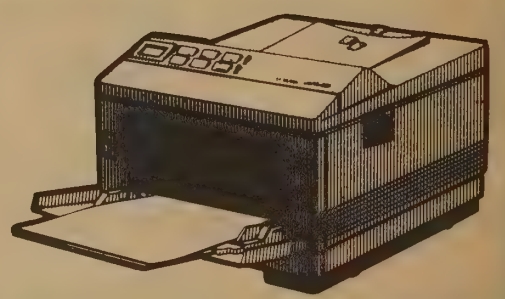

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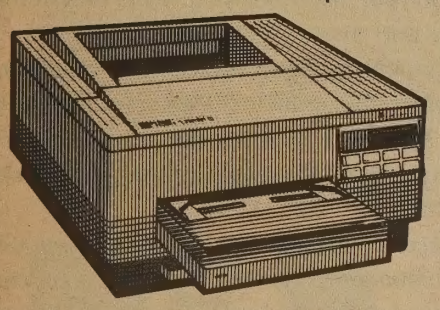

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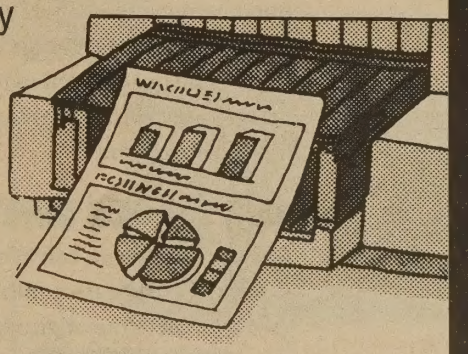

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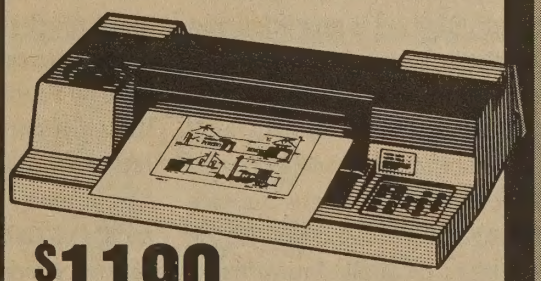

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Software Mania II

After Crushing The Paperback Software Menace For The World Spreadsheet Championship, Lotus Now Takes On Borland

BY JOHN C. DVORAK

If there's big news in the industry, it's over the results of the Lotus vs. Paperback Software lawsuit. "Look and feel" is the issue.

Lotus won the suit, claiming that Paperback's VP-Planner, an outstanding clone, was too outstanding. In fact, it was hard to distinguish it from the real thing, 1-2-3. Now a product that is clearly superior to Lotus, Borland's Quattro Pro, is under attack. Sued by Lotus. Everyone is mad at Manzi and Lotus for pursuing Borland, but who can blame them if the legal system goes along with the program? We live in a litigious society, after all. Manzi would be remiss if he didn't pursue this to the logical end.

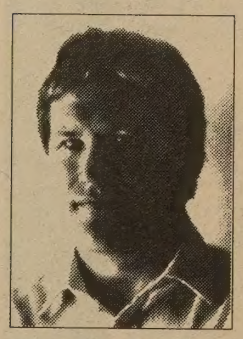
Hopefully, in the Borland situation a better precedent will be established, and the concept of "fair use" (used by the print media so often to legally quote and cite copyrighted material) will be introduced into the software scene.

FAIR USE FOR SOFTWARE?

Fair use means you can take a small portion of someone else's material and incorporate it into your own material. Usually this requires giving credit to the originator. If Borland uses a non-Lotus front-end, but makes available a Lotus-compatible command set and gives credit to Lotus, then fair use should apply. In the case of Paperback Software, the Lotus front-end was a permanent part of the interface, with no such credit given.

After all, it's only the command set that we're talking about. The underlying code and everything else about the two products is different. Furthermore, with Quattro, the command set is an option and fair use credit is given. It's important to the industry and the future of computing that the courts see it this way; otherwise no two software packages will ever be nearly the same and there will be no such thing as a standard. The idea of improving an idea and progressing towards some brighter future will be dimmed forever if Lotus wins the case against Borland. The future might also be bleak if Borland wins for the wrong reasons. The Fair Use concept has to be applied to software once and for all.

DVORAK'S LAST COLUMN



John C. Dvorak graduated from the University of California. He is a contributing editor of PC Magazine *and* MacUser, *and is considered by many to epitomize the contrarian view of things—a charge that he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.* *Copyright © 1990 by John C. Dvorak. All rights reserved.*

If I were Bill Gates at Microsoft I'd give Philippe Kahn at Borland a call and say, "How much money and help do you need to win this case?" If Borland loses on this issue, Microsoft will surely lose in its role as a defendant fighting Apple over the look and feel of Windows. If all "look and feel" is actionable, then Windows and Presentation Manager are at risk. This is despite the fact that Windows and PM are only partly similar to the Mac interface.

What's important is the direction of legal precedent. This mess all began with Brøderbund suing a small company, Unison World, for making a PC version of its popular Print Shop program. The interface was just like the interface of Print Shop. I thought the case was two-bit, hokey. The decision was based on an old precedent established by Hallmark Greeting cards concerning the look and feel of a greeting card. The Brøderbund lawyers had simply outflanked the Unison World attorneys and convinced the court that the product was a rip-off, even if it wasn't even running on the same machines and didn't incorporate the same code. It had a similar "look and feel," that was all.

A few months after that case was settled in 1987, the Lotus suit was filed. I'm sure that the world would be a better place had Brøderbund not won that case. The Borland case may be the last chance to turn the courts around.

Personally, and I've written about this before, I think both the patent laws and the copyright laws are far too restrictive. Patent laws are designed for a slow-moving pre-industrial revolution society and now do little more than hamper progress. This fact is becoming increasingly more apparent as the patent-happy Japanese attempt to patent everything from dropping a hammer on your foot from ten feet to dropping a hammer on your foot from two feet and everything in-between. Soon everyone is in court.

Watching the machinations between Hitachi and Motorola, for example, over their various semiconductor patents is sickening. Who benefits from all this? Motorola? Hitachi? The public? The court system? Try this answer: nobody. Even the attorneys would rather find other things to do.

The Motorola-Hitachi suits (which, if you don't know, have almost resulted in the ceased production of the Motorola 68030, a key chip in the newest Apple Macintoshes) are the future. It's going to get worse and worse. Furthermore, the complexity of such cases cannot be handled by any court system in the world. It's ridiculous. If World War III is going to break out, it will be over a patent violation.

A good way to begin to clear up this mess is to reduce the patent life to five years. In today's fast-paced society we can't afford to wait forever for important technologies to be released into the public domain. Besides that, litigation will have a race against time and be made more efficient in the process.

The copyright laws, too, are a mess. The fact that John Fogerty got sued by Fantasy Records for just being himself shows how ludicrous the copyright laws are. Paul McCartney has to pay royalties to Michael Jackson to sing McCartney-composed songs. It's ridiculous. Intellectual property cannot be magically transformed into real property by an act of Congress. What you end up with is an abomination. By making every three words, however and wherever used, copyrightable and "property," you create an unreasonable mess.

Copyright laws were designed to protect the publishing industry from open bootlegging. They weren't designed to keep people from singing their own songs, or to keep writers from repeating themselves. Above all, copyright laws were not designed to protect the order of characters that appear on an 80 x 24 screen. This notion, and all related computer-oriented notions concerning copyright, have been afterthoughts—court interpretations. It's a kludge. What we need is some new form of protection—not copyright nor patent—specifically designed for software. It should protect ONLY the underlying source code from blatant rip-offs. That's what everyone in the business says should be protected. That's what everyone has always said should be protected.

Of course, now that the courts have altered the course of history by equating Hallmark Greeting Cards with computer software, all hell will break loose. The big loser: progress. For now, a liberalized Fair Use concept would suffice. ■

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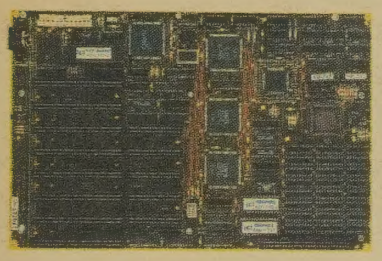

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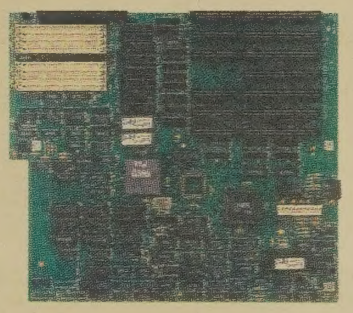

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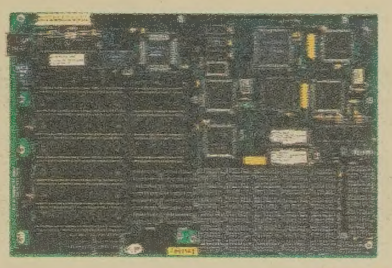

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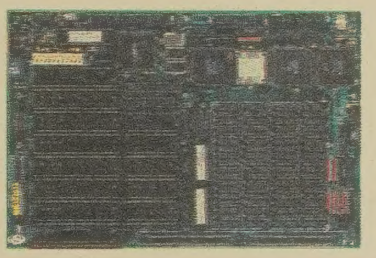

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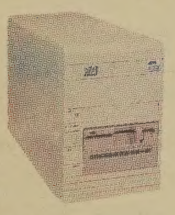

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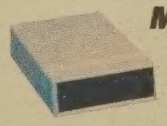

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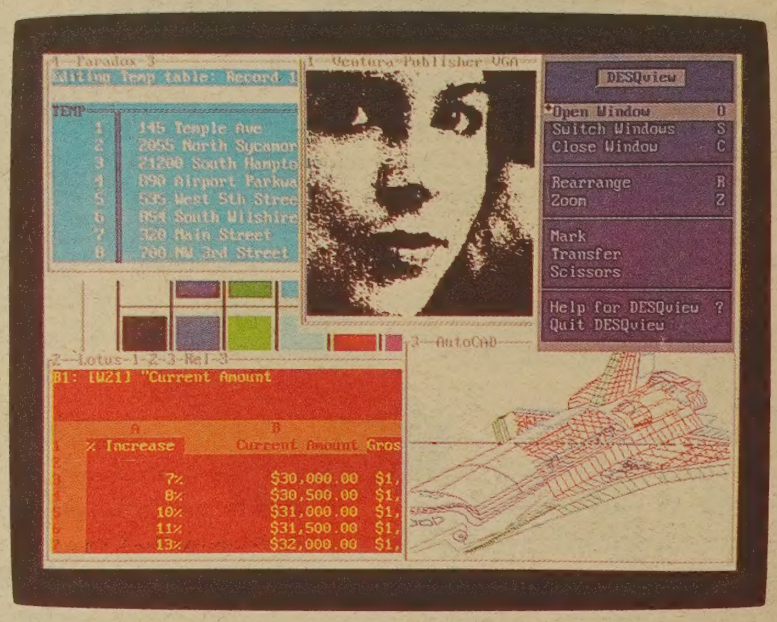

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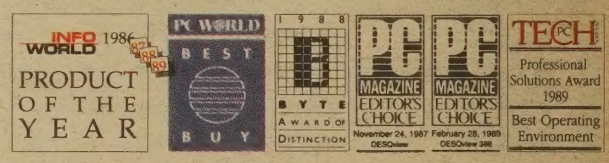
INFO WORLD 1986
PRODUCT OF THE YEAR
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PC MAGAZINE EDITORS' CHOICE November 24, 1987 DESQview
PC MAGAZINE EDITORS' CHOICE February 28, 1989 DESQview 386
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Some of DESQview's recent awards

Our newest products, Quarterdeck Manifest and QRAM, help you understand and optimize the most critical part of your PC's memory—the first megabyte.

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DESQview System Requirements: IBM Personal Computer and 100% compatibles (with 8086, 8088, 80286, or 80386 processors) with monochrome or color display; IBM Personal System/2 • Memory: 640K recommended; for DESQview itself 0-145K • Expanded Memory (Optional): expanded memory boards compatible with the Intel AboveBoard; enhanced expanded memory boards compatible with the AST RAMpage; EMS 4.0 expanded memory boards • Disk: two diskette drives or one diskette drive and a hard disk • Graphics Card (Optional): Hercules, IBM Color/Graphics (CGA). IBM Enhanced Graphics (EGA), IBM PS/2 Advanced Graphics (VGA) • Mouse (Optional): Mouse Systems, Microsoft and compatibles • Modem for Auto-Dialer (Optional): Hayes or compatible • Operating System: PC-DOS 2.0-4.0; MS-DOS 2.0-3.3 • Software: Most PC-DOS and MS-DOS application programs; programs specific to Microsoft Windows 1.03-2.1, GEM 1.1-3.0, IBM TopView 1.1 • Media: DESQview 2.0 is available on either 5-1/4" or 3-1/2" floppy diskette.

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Quarterdeck

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